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CANADIAN PUBLIC HEALTH JOURNAL

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History of Civil Registration in Quebec*

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IN the Canadian Provinces and in most other countries the word "Registration" designates that procedure by which a birth, a marriage or a death is declared to and registered by a person appointed for that purpose: the Registrar, who fills in the adequate form for each case. These forms serve two purposes: (*a*) official and legal registration of the event under consideration, and (*b*) collection of data necessary for the vital statistics compilation. These forms, moreover, assume the status of official documents.

In the Province of Quebec, there is a difference to be noted. Although one and the same person performs the duty of "registrar" he fulfils these various duties in accordance with different laws and by procedures which are clearly distinct one from the other. Our registrars do the registration in accordance with one law, the Civil Code; they collect vital statistics in accordance with another law enacted only five years ago. Different procedures are thus entailed: the registration is made in special books and statistics collected on the well known forms. These procedures have in common only their simultaneous execution. In virtue of this distinction, one may affirm that we always had registration in our Province whereas collection of vital statistics (for the national compilation) dates only from 1926. Consequently, with us the term "registration" does not have exactly the same significance ordinarily given to it.

The purpose of this paper is (1) to define our registration; (2) to describe its origin and development; (3) to show how it is applied; and (4) to indicate the results obtained from it.

DEFINITION

The purpose of registration, in any country, is to establish a written

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and permanent official record to prove the occurrence of a birth, a marriage or a death. In this respect, registration in Quebec does not differ from that in the other provinces. We do find a marked difference, however, in the facts (*a*) that we register baptisms, marriages and burials; (*b*) that our registrars are the priests and ministers of all religions; (*c*) that this registration is done in special and official books of records which are entrusted to the clergyman in charge of each church and (*d*) that the system is worked out without remuneration by the clergy. In thus attempting to describe our registration I have also given you some idea of the manner in which it is effected.

ORIGINS

If we retrace the history of demography, we find that it was in 1539, in France, that the first registration of births, marriages and deaths was made. At that time, the religious authorities of France were confronted with the necessity of some system of registration for the sole purpose of supervising the religious facts of the population of each parish. We thus find that this registration proceeded from a religious motive. Accordingly, baptisms were registered at the time of presentation of the infant at the baptismal font; burials were registered when the religious service was performed and marriages when the wedding was celebrated at church. It must now be remembered that the French population of the time was wholly Roman-Catholic and that, in consequence, all children were baptized, all marriages celebrated at the church and that there was no burial without a religious service. Whence, it follows that registration was complete once it had been started in any particular church or parish.

Some years later, the royal authorities of France perceived the immense advantage to be derived from such registration in connection with the civil status of all citizens. So, Louis the Fourteenth, in 1666, promulgated an edict which legalized the system and made it compulsory for all parish priests, in the Kingdom of France. Begun in 1539 by private initiative, this method of registration became legal and civil in 1666. Meanwhile, it had been adopted by few other countries such as Norway, Denmark, Sweden, etc.

Until 1666, registration was made by each priest in a single book of records which was permanently preserved in his church to be later transmitted to his successor in office. Following the edict of Louis the XIVth, each "curé" or parish priest had to keep two books of records which were henceforth called "Registers of the Civil Status" and were identical. One, as in the past, was to remain in the custody and possession of the curé; the other was to be transmitted to the civil authorities.

Such was the origin of the system in France. With the foundation of Quebec (1608) and the arrival of the first missionaries, the system

was imported into New-France. This explains why I previously said that our actual system of registration had always existed in our Province. However, the oldest registers of the Province do not go back to 1608. The population was then very limited and it was not until 1615 that the first missionaries came to Canada. Since their arrival, the Jesuit Fathers have registered deaths but in Latin language and in books for their own personal use. Marriages and births were very rare events at that period. After a few years, however, registers were kept regularly in the first church of Quebec, the church of Notre-Dame-de-la-Recouvrance and the oldest of these records we have at present goes back to 1620. Unfortunately, all registers which have been filled from 1620 to 1640 were destroyed when this first church burned in 1640. The curé in charge of said church at that time considered it advisable to reconstruct the burned registers; this was not too difficult for him since he, himself, had entered the rather limited number of registrations. It is to be regretted, however, that he effected such a reconstruction for births and marriages only, and not for deaths. So, the oldest registers we possess date from 1620 but those from 1620 to 1639 are not originals. As a consequence, we can find the registration of the first marriage celebrated at Quebec, that of Guillaume Couillard to Guillemette Hébert, registered the 26th of August, 1621; and the act of registration of the first birth, entered the 24th of October, 1621, of the child of Abraham Martin, called the Scotsman, that seafaring miller who left his name to the celebrated Plains of Abraham. But, since the reconstruction has not been made for deaths of 1620 to 1639, we have not the act of registration of the death of Champlain who died in 1635.

When Montreal was founded in 1642, the same method of registration was also started there and was also in Latin language until 1657 when the first curé of Montreal was appointed; the records we have for the period 1642-1680 are rather concise as we shall see later.

The edict of Louis XIVth, mentioned above, was not applied in New-France until 1678; in consequence the duplicate registers date back only to that year, one of the registers being deposited in the record's office of each of the towns of Quebec and Montreal only then. Courts of Justice, with a record's office, were instituted in Quebec City in 1628 and in Montreal City in 1648. Each of these two governmental judiciary offices, under the custody of prothonotaries, and archivists, contains official records of registration back to 1678 and for the Roman-Catholic population only. It is only after the cession of Canada in 1760, that we find registers, in these record's offices, for the protestant population. Following the cession of Canada, the English protestant ministers did not at first consider it necessary to adopt the French method of registration. When they adopted it in 1796, they found it necessary to reconstitute all registrations since 1760.

METHOD OF APPLICATION

Let us consider now (*a*) the laws governing this system of registration; (*b*) the procedure which is followed for their application and (*c*) the advantages of the system.

Laws

These originated necessarily with the edict of Louis the XIVth, in 1666, and they have encountered but very little modification through the centuries. At present, these laws are found included in our Napoleonic Civil Code, still in force in the Province of Quebec and in which there are four chapters relating to this registration. I need not cite here each and every one of the articles contained in these four chapters but those who might be interested will find them in a copy of all extracts combined in a special pamphlet. However, it is of some interest to read the principal articles of the Civil Code.

The first of the four chapters gives the general provisions of registration to be made in the Registers of the Civil Status. We find the following important ones:

Art. 42—"Acts of civil status are inscribed in two registers of the same tenor, kept for each Roman-Catholic church, parish church, private chapel, or mission, and for each protestant church or congregation, or other religious community, entitled by law to keep such registers, each of which is authentic, and has in law equal authority."

Art. 47—"Within the first six weeks of each year, the person who keeps the said registers, or who has charge thereof, deposits in the office of the prothonotary of the Superior Court of the district in which the registers were kept one of the said duplicates."

Art. 49—"The other duplicate register remains in the custody and possession of the priest, minister or other officer who kept same, to be by him preserved and transmitted to his successor in office."

Art. 50—"The depositary of either of the registers is bound to give extracts thereof to any person who may require the same; and such extracts, being certified and signed by him, are authentic."

Such is the general outline of the procedure governing the application of our system of registration. First: two identical registers kept by the priest or clergyman of any religious denomination who is officially appointed by his congregation in charge of a church, parish, mission, etc. Second: provision for ready delivery of legal certificates.

So far, there is mention only of registration by priests or ministers and they make said registration, as previously explained, when they baptize, wed or bury. But, in our Province, there are, as elsewhere, persons adhering to no religion or faith, who do not have their children baptized or who have no religious service for their deceased. These births and deaths must nevertheless be registered and provision for same is contained in the following article of our Civil Code:

Art. 53*a*—"The father, or in case of his death or absence, the mother, of

every child, who has not caused such child to be baptized, or who, being of a creed other than Roman Catholic, has not caused the birth to be registered by the persons authorized to keep a register of acts of civil status, is bound to cause the birth of such child to be registered, within four months from the date thereof, at the office of the secretary-treasurer or of the clerk of the municipality or city of his domicile. . . ."

"Such secretary-treasurer or clerk of the municipality or city shall, immediately, enter such declaration in a duplicate register for this purpose. . . ."

Deaths of non-Roman-Catholic persons are registered in the same way but such cases are very few, for burial can be provided only in a cemetery. The priest or minister responsible for the control of the cemetery will necessarily register the burial. Then, we have provisions for all births and all deaths. So far as marriages are concerned, these can be performed only in the presence of some minister of religion, for there is no civil marriage in our Province.

We now have to see briefly the provisions regulating each special act of registration and in the Civil Code again we find the following articles:

For registration of baptisms (or births).

Art. 54—"Acts of birth set forth the day of the birth of the child, that of baptism, if performed, its sex and the names given to it; the names, surnames, occupation and domicile of the father and mother, and also of the sponsors, if any there be."

Art. 55—"These acts are signed in both registers, by the officer officiating, by the father and mother, if present, and by the sponsors if any there be; if any of them cannot sign, their declaration to that effect is noted."

For registration of marriages.

Art. 65—"The act of marriage sets forth the day on which the marriage is solemnized, the names, surnames, quality, or occupation and domicile of the parties married, the names of the father and mother of each, or the name of the former husband or wife; whether the parties are of age or minors; whether they were married after publication of banns, or with a dispensation or a license; the names of the witnesses and whether they are related or allied to the parties, and, if so, on which side, and in what degree; that there is no opposition or that any opposition made has been disallowed."

For registration of burial.

Art. 67—"The act of burial mentions the day of the burial, and that of the death, if known; the names, surname, quality or occupation of the deceased; and it is signed by the person performing the burial service, and by two of the nearest relations or friends; if they cannot sign, mention is made thereof."

From this review of the most important articles of our Civil Code, it is apparent that the procedure is quite uniform, which uniformity still rules in the practice. We may add a few words with regard to the registers entrusted to the non-Roman-Catholic ministers. We have noted in art. 54, relating to registration of baptisms (or births), the following words: "Acts of birth set forth the day of the birth, that of baptism, if performed. . . ." From this sentence, we can deduce that

a birth can be registered in said registers without the administration of baptism. And it occurs that, in the front page of the registers delivered to these non-Roman-Catholic ministers, it is stated that they are for the purpose of registering baptisms as well as the registering of births. These two terms are not identical in meaning as you readily discern. In practice, a Roman-Catholic priest does not register a birth without performing the christening of the child, but a non-Roman-Catholic minister can do so. This happens when a child is born in a family which does not belong to any creed, or when the creed of this family does not teach baptism, or again when the family, for one reason or another, wishes to delay the baptism. Such a child must be registered and the minister of the family can make this registration without christening.

Procedure

This procedure is readily understood after our review of the most important articles of the Civil Code. It may be summarized in a few words, as follows: (1) The Province is divided into 26 judiciary districts of the Superior Court of Justice, with a record's office under the care of the prothonotary. It is in the record's office that there are preserved all the registers of all parishes of each district. (2) At the beginning of each year, the curés and ministers of all parishes, in each district, must present to their district prothonotary the blank registers for approval, apposition of the seal and the count of all their pages. (3) During the year, registration of births, marriages and deaths is made in these registers. (4) After the elapsed year, these registers are turned in to the prothonotary, and each registrar keeps a copy for himself. (5) On request, extracts from these registers may be obtained either from the priest or minister, or from the prothonotary's office.

There is nothing important to say here about the judiciary divisions of our Province; it may, however, interest you to know that the number of registrars in these districts varies considerably according to the population of the districts. For instance, the Montreal district contains some 357 registrars and this is to say that, each year, the prothonotary of the Montreal district receives as many registers. Out of these 357 registers, 167 are written in French and 190 in English, but the French ones contain some 60 per cent. registrations more than the English registers. All these 357 registers are equally divided between Roman-Catholic and non-Roman-Catholic population, or 179 Roman-Catholic and 178 protestant. It is also of interest to note that, in 1700, this same district of Montreal provided only 10 registers.

When a curé or minister is provided with his two registers, at the beginning of the year, he only has to keep them at hand, ordinarily in the church, for all possible registrations. When this parish priest performs a baptism, a marriage or a burial, as soon as the ceremony is ended, he takes his registers and writes the necessary act in them;

when this is completed, he must read the statement to the interested persons who approve, or disapprove, and sign with the minister. Registration is thus made. Ordinarily, a minister makes registration only for his parishioners as he is called to baptize, marry or bury only members of his own flock. It is in fact generally understood that the parishioners of a church will have their children baptized only at that church, that likewise they will be married there (according to the residence of the bride) and have their burial service there also. From time to time, and for one reason or another, registration of persons not belonging to a church may be made by its curé, although this occurs very seldom.

We notice, further, that our registration is not made in accordance with the civil limits of municipalities or geographical limits of counties. In the country, where a single religious parish covers the territory of a single civil community, the demarcation is a simple matter. But, in the more populous centres, as in cities or towns, we find several registrars within the civil limits of the same municipality. In Quebec City, for instance, besides a certain number of protestant registrars, we find a total of 25 Roman-Catholics fulfilling the duties of registrars.

Advantages

Among the numerous advantages of this system of registration, you probably have already noticed its antiquity, its uniformity and the authenticity of its records. Nothing will better serve to demonstrate these qualities than a few examples. I have already mentioned that, in the City of Quebec, registration was officially begun in 1621, or something over three centuries ago; and I have also mentioned the registration of the first birth, that of the child of Abraham Martin, the 24th of October, 1621. I have obtained a true copy of this registration and present it to you. Naturally, this act was written in French, but I try to give you an English version which closely follows the French.

PAROISSE DE NOTRE-DAME-DE-QUEBEC

EXTRAIT DU REGISTRE des baptêmes, mariages et sépultures de la paroisse NOTRE-DAME-DE-QUEBEC pour l'année mil-six-cent-vingt-et-un.

Le vingt quatre octobre, mil six-cent-vingt-et-un, le Père Denis, Recollest, faisant fonction de Curé à Québec, baptisa Eustache Martin, fils d'Abraham Martin, dit l'Ecossais, et de Marguerite Langlois, Monsieur Eustache Boulay fut parrain et Guillemette Hébert, espouse de Guillaume Couillard, fut marraine.

PARISH OF NOTRE-DAME-DE-QUEBEC

EXTRACT FROM THE REGISTER of Baptisms, Marriages and Burials of the Parish of NOTRE-DAME-DE-QUEBEC for the year one-thousand-six-hundred-and-twenty-one.

On the twenty-fourth day of October, one-thousand-six-hundred-and-twenty-one, Father Denis, of the order of Recollet, performing the functions of Curé, at Quebec, baptized Eustache Martin, son of Abraham Martin, called the Scotsman, and Marguerite Langlois. Monsieur Eustache Boulay was Godfather and Guillemette Hebert, espouse of Guil-

LEQUEL EXTRAIT, NOUS, CURE DE Notre-Dame-de-Québec, certifions être la vraie copie de l'original conservé dans nos archives paroissiales.

DONNE A QUEBEC, le vingt septième jour du mois de mars mil-neuf-cent-trente.

EUG,-C LAFLAMME, curé.

laume Couillard, was Godmother.

WHICH EXTRACT, WE, Curé of Notre-Dame-de-Quebec, undersigned, certify to be a true copy of the original preserved in our parochial archives.

GIVEN AT QUEBEC, the twenty-seventh day of the month of March one-thousand-nine-hundred-and-thirty.

EUG.-C LAFLAMME, curé.

This is the oldest registration to be found in the Province of Quebec. I have told you that all registers of Quebec City for the years 1621 to 1640 were destroyed in that last year but that they were reconstructed from memory. In consequence, the above extract is a true copy of the reconstruction made in 1640 and this explains its brevity and its writing at the past tense. But here is an extract of a marriage registration dated 1680, taken from the registers of the parish of Charlesbourg, a neighbouring parish of Quebec City, and one of the oldest of the Province. Charlesbourg was established in 1679 but its first curé was appointed only in 1693. The first registration of a birth was entered in Charlesbourg on July the 31st, 1697 and the first marriage, the one we will now read, on January 19th, 1680, both by a travelling missionary.

EXTRAIT DES REGISTRES DE CHARLEBOURG POUR L'ANNEE MIL-SIX-CENT-QUATRE-VINGT.

Le dix-neuvième jour de janvier de l'an mil-six-cent-quatre-vingt, après les fiançailles et la publication des trois bans faite le quatrième et septième du présent mois de janvier d'entre Jean Omer agé de viente ans habitant de la rivière des Roches, fils de Jean Omer et de Madeleine Lemorgue, ses père et mère de la paroisse du bourg de Coiem, evêché de Xamtes d'une part; et Anne Guevin, agée de treize ans fille de Clément Guevin et de Perrine Poirier, ses père et mère de cette paroisse de Charlesbourg d'autre part: Je, Charles Grandelet, faisant les fonctions curiales en la paroisse de Charlesbourg, solennellement mariez et donné la bénédiction nuptiale en présence de Pierre Poirier, habitant de la dite paroisse de Charlesbourg, cousin de la dite Anne Guevin, Réné Bruno dit Jolycoeur, habitant aussi de la dite paroisse, Claude Fournier garçon demeurant à Québec et Guillaume Chabot, garçon demeurant à la dite paroisse, témoins qui ont déclaré ne scavoir signer suivant l'ordonnance.

EXTRACT FROM THE REGISTERS OF CHARLESBOURG FOR THE YEAR ONE-THOUSAND-SIX-HUNDRED-AND EIGHTY

On this nineteenth day of the month of January of the year one thousand-six-hundred-and-eighty, following the betrothal and publication of the three banns on the fourth and seventh of the present month of January as between Jean Omer aged twenty years, resident of the River des Roches, son of Jean Omer and of Madeleine Lemorgue, his father and mother of the Parish of the Bourg of Coiem, Bishopric of Xamtes of the one part; and Anne Guevin aged thirteen years, daughter of Clement Guevin and of Perrine Poirier, her father and mother of this parish of Charlesbourg of the other part: I, Charles Grandelet performing the functions of curé in the parish of Charlesbourg do solemnly give in marriage and bestow the nuptial benediction in presence of Pierre Poirier, resident of the said parish of Charlesbourg, Réné Bruno, called Jolycoeur, also of the said parish, Claude Fournier, bachelor dwelling at Quebec and Guillaume Chabot, bachelor, dwelling in the said parish, wit-

CHARLES GRANDELET, ptre.

POUR VRAIE COPIE
Chs.-A Godbout, curé
Charlesbourg
1 Avril 1930

nesses who have declared themselves unable to sign as required by the ordinance.

CHARLES GRANDELET, priest.

For True Copy
Chas.-A. Godbout, curé
Charlesbourg
April 1st, 1930

This registration is certainly more detailed; it gives fully the names of the husband and wife, their ages (and we note that the bride was only thirteen years of age), the names of their fathers and mothers as well as their residence and names and residence of witnesses.

Here now is a last proof of the ancientness of our system of registration. If this following extract does not date as far as the foundation of Quebec, it certainly gains interest by its historical quality. This is the death registration of the General Marquis de Montcalm, vanquished at the celebrated battle of the Plains of Abraham where he received the wounds from which he died the following day. I can not give you a similar registration for the death of General Wolfe for he was buried in England and we then, as to-day, were registering burials and not deaths.

EXTRAIT DU REGISTRE des baptêmes, mariages et sépultures de la paroisse de NOTRE-DAME-DE-QUEBEC pour l'année mil-sept-cent-cinquante-neuf.

L'an mil-sept-cent-cinquante-neuf le quatorzième du mois de septembre a été inhumé dans l'église des Religieuses Ursulines de Québec haut et puissant Seigneur Louis Joseph Marquis de Montcalm, Lieutenant Général des armées du Roy, commandant de l'ordre royal et militaire de Saint Louis, Commandant en Chef des troupes de terre en l'Amérique Septentrionale, décédé le même jour de ses blessures au combat de la veille, muni des sacrements qu'il a recus avec beaucoup de piété et de religion. Etaient présents à son inhumation Mgrs. Resche, Cugnet et Collet, chanoines de la Cathédrale, Monsieur de Ramesay, commandant de la place, et tout le corps des officiers.

RESCHE, prêtre-chanoine
COLLET, chanoine

LEQUEL EXTRAIT, NOUS, CURE de Notre Dame-de-Québec, soussigné, certifions

EXTRACT FROM THE REGISTER of Baptisms, Marriages and Burials of the Parish of NOTRE-DAME-DE-QUEBEC for the year one-thousand-seven-hundred-and-fifty-nine.

In the year one-thousand-seven-hundred-fifty-nine, on the fourteenth of the month of September was interred in the church of the Ursulines of Quebec great and puissant Seigneur Louis Joseph the Marquis of Montcalm, Lieutenant General of the Royal Armies, Commander of the Royal and Military Order of Saint-Louis, Commander-in-Chief of land troops in North America, deceased this day from his wounds received at the battle of the previous day, administered with the sacraments which he received with much of piety and faith. Were present at his interment Mgrs. Resche, Cugnet and Collet Canons of the Cathedral, Monsieur de Ramesay, Commandant of the fortress and the entire corps of officers.

RESCHE, Priest-Canon
COLLET, Canon

WHICH EXTRACT, THE CURÉ of Notre-Dame-de-Quebec, undersigned, certifies to be

être la vraie copie de l'acte original conservé dans nos archives paroissiales.

DONNE A QUEBEC le vingt-neuvième jour du mois de mars mil-neuf-cent-trente.

EUG. C. LAFLAMME, curé

a true copy of the original preserved in our parochial archives.

GIVEN AT QUEBEC this twenty-ninth day of the month of March one-thousand-nine-hundred-and-thirty.

EUG. C. LAFLAMME, curé

These extracts from our oldest records clearly demonstrate the antiquity of our registration. You may have noticed that these three extracts are all taken from the Archives of Quebec City. The reasons are, first, that it was much more easy for me to secure them; second, that the Archives of Quebec are the oldest; the records of the district of Montreal, the next in order after Quebec, date back only to 1657 and the registrations we find in those registers of from 1657 to 1680, as previously stated, are very concise and brief. Here is an example:

"Le premier juin a été enterré Messire Louys d'Ailleboust ci-devant Lieutenant Général pour le Roy, pris au fort, un des premiers Seigneurs de l'Isle."

"The first of June was interred Messire Louys d'Ailleboust former Lieutenant-General for the King, killed at the Fort, one of the great Seigneurs of the Island."

Although this registration refers to a Governor of New-France, no further details are given in the certificate of burial. However, I think that the above examples are sufficient proof that our system of registration dates back to the very earliest days of Canada.

It has also been told that this system is still functioning perfectly throughout the Province and with perfect uniformity. To demonstrate this uniformity I might have shown three copies of registration made in 1930 in three different parts of the Province and entered by ministers of three different creeds—Anglican, United Church and Baptist. It would be seen that the procedure is uniform throughout the whole Province and for all ministers.

RESULTS

The advantages of antiquity, uniformity and authenticity which we find in our system of registration and which have just been demonstrated are, to a degree, inherent to the system itself, although these advantages might also be considered as results. However, there is but one important result we find in that system and this is its efficacy which derives from the following qualities.

Spontaneity

We cannot say that, in our Province, registration is effected without the knowledge of the population; but, in fact, it is certainly effected without any special effort of this population. This derives from the fact that, in about 98 per cent of the cases, registration is made at

church when the religious services required by the event under consideration are performed. Families do not go and have a birth registered; they go and have the children baptized. After this ceremony is ended, the act of registration is made and signed. This has become an intrinsic part of the religious ceremony, and the same applies to marriages or burials.

Completeness

It is indeed hard to claim that we have 100 per cent of all possible registration but we can easily say that we are not far from that result. It must be born in mind that our population is composed of 90 per cent Roman-Catholics and that all Roman-Catholics have their children baptized, their marriages celebrated and all their burial services held at the church; it follows that 100 per cent of Roman-Catholic events are registered. The remainder of the population, the non-Roman-Catholics, may be divided in two groups: those people who also pass through the church and who equal about the ¾ of the 10 per cent, and those who very seldom go to church or do not go at all. This ¼ of the 10 per cent of our population does reduce to about 99.5 per cent our returns of registration, when their demographic events are not registered by secretary-treasurers, as previously seen.

Searches

The efficacy of the system is again evidenced by the facility with which the genealogy of any family may be traced, even back through several centuries, because of the antiquity of our registration. Families can thus follow the various registrations of their ancestors back to the arrival of their forefathers in our Province.

Collection of Vital Statistics

Finally, the efficacy of this system is again demonstrated by the facility with which we now collect the necessary data for the vital statistics compilation. Since about 1885, some of these data were annually collected in our Province by the fact that, at the end of each year, all priests were obliged to forward to our statistician a statement giving the totals of births, marriages and deaths in their parishes; they were also forwarding to the same statistician all medical certificates. According to this, a rather short compilation could be made but it merely gave the totals of such events. When the question of our admission in the national registration area arose, with the existence of our system just described, it was first thought difficult to collect the required information. Two methods were considered—(*a*) that of appointing civil registrars and (*b*) that of appointing as "registrars" all the priests and ministers. As we had to effect an adjustment between our old method of registration and the new method of collection which was in force in the other provinces, the latter suggestion was certainly

the one which could be more easily applied. But it was necessary to obtain the consent of the religious authorities. When these authorities understood the practical value of the proposal, they accepted without hesitation. In consequence, the curés or clergymen who are now entrusted with the keeping of the registers of Civil Status are also our "registrars" and here is the point where the two systems meet, according to the Act of 1925, the first article of which reads as follows:

> Art. 1—"Every person entrusted with the registration required by the Civil Code, of births, marriages and deaths, shall, for each birth, marriage and death registered, cause to be filled in, or himself fill in, one of the three forms D E or F, of this act, and, during the first fifteen days of each month, forward to the Director of the Provincial Bureau of Health all the forms filled in during the previous month."

Accordingly we now receive one statistical form for each birth, each marriage and each death registered by all priests or clergymen, who, from our standpoint, are now called "collectors". Here also we now see that our statistical forms are merely statistical forms and not registration ones; and that the differentiation made at the beginning of this paper between "registration" and "vital statistics" appears more clearly. These are two words with two different meanings and the facts they denote are obtained in two different ways although from a single person.

With regard to the collection of vital statistics, it might be of interest to tell that, being based upon the old system of registration which possesses the quality of completeness, it also possesses the same advantage.

These remarks could hardly be condensed further without some sacrifice of clearness or precision, I hope, however, that it has proved of interest to you.

THE DIAGNOSIS OF CANCER

IT is useless to educate the public unless the profession can meet the demands so stimulated, and the profession cannot do so unless the facilities both for undergraduate and for postgraduate instruction are developed far beyond their present status. Even if this development takes place, it will be useless unless the profession sees its opportunity and uses it to the full. Then and only then will there be any real control of the cancer situation.—*Francis Carter Wood, M.D.*

Iodine Prophylaxis and Endemic Goitre

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Methods of Administration of Iodine

Various methods have been suggested within modern times for the prophylactic administration of iodine. The most important are: Either as sodium or potassium iodide, weighed amounts in solution or in tablet form, chocolate-coated or otherwise rendered palatable to the young, or as an iodized fat (iodostarin) similarly presented, or as iodide added to the drinking water of a community or to table-salt for bulk treatment of still larger community units, or by increasing the iodine content of cow's milk by feeding cattle iodine, or by adding to the soil iodine-containing fertilizers to increase the iodine content of vegetables, or by encouraging the whole population to eat more of marine foods, proved to be excellent purveyors of iodine to man.

All such methods are potentially good, as far as the individual on a controllable diet is concerned. They are not equally good in considering the welfare of a large community, whole provinces of a nation, or the nation itself. In such large units it is essential, to prevent the onset of endemic goitre, that the pregnant woman receive an adequate amount of iodine during the whole of her pregnancy, and that the growing child be adequately supplied. Nor can the mere adult's supply be entirely taken as a matter of ocurse. Increase of milk content by feeding cattle, increase of vegetable content by suitable manuring, increase of consumption of marine products, are all uncontrollable methods and tend to increase the cost of iodization of a community unduly. Iodization of a water supply means duplication for each community with a separate water supply and will not reach a rural population. Tablet methods, used largely in schools, concern only the school population, and have disadvantages even for it. As Hercus, Benson, and Carter remark[25]: "The body requires an adequate daily supply of iodine throughout life, for normal thyroid activity. To recognize the deficiency and to supply it during the school period only, subject to the caprice of the parent, is unsound." Carrière merely stated an obvious truth in saying (I.C.G., XXVII): "Antigoitrous prophylaxis, to achieve efficacy, must reach the population generally." Professor Wagner von Jauregg has laid down certain dicta (I.C.G., 444) which, once expressed, also seem obvious: "The prophylaxis of a disease must become effective before danger through the disease sets in. Applying this thought to endemic goitre

. . . . . prophylaxis must begin to have effect upon the child even before birth, perhaps even upon the germ-cells. . . . . The prophylaxis of a disease, if it is really to be efficacious, must extend over all that are endangered by the disease. That is to say, over the entire population in places where goitre is endemic. . . . . The prophylaxis of a disease ought finally to be removed as far as possible from any initiative on the part of the individual, for how difficult it is to carry out a hygienic measure against the want of intelligence of mankind can be understood from the difficulties against which, for example, vaccination has at the present day to combat in many places."

From such considerations the great majority of investigators seem to be agreed that the iodization of salt, used for table and culinary purposes, is the ideal procedure for treating the largest community units. If such treatment be instituted, as it has now been in several countries, what amount of iodine should be added?

CORRECT DOSAGE OF IODINE

The amount of iodine at present added to table salt varies over a wide range in different countries, as the following comparison shows:

Michigan, U.S.A.	1 part of KI or NaI to	5000 parts of table salt
Canada	1 part of KI or NaI to	10000 parts of table salt
Valtellina (Italy)	1 part of KI to	100000 parts of table salt
Switzerland	1 part of KI to	200000 parts of table salt
New Zealand	1 part of KI or NaI to	250000 parts of table salt

Such wide divergences are obviously unnecessary. Either the small amount used in Swiss or New Zealand salt is insufficient, or the much greater amounts used in Canada and certain parts of the United States are much too large. Evidently we require to know what is the minimum amount of daily intake of iodine sufficient to maintain in normal health a normal individual. We have several lines of evidence.

von Fellenberg[11] estimated, from analyses of food (cf. Table I) that the daily iodine intake of an inhabitant of La Chaux de Fonds was 31.3γ, that of Signau, 13.0γ. The difference, 18.3γ, applied to 10 gms. of salt, gives a ratio of 1:550,000. Similarly, Hercus and Roberts[26] measured the actual iodine intake per person per day of 20 people in a goitrous district (Canterbury, N.Z., 62 per cent of the children goitrous) and in a non-goitrous district (Taranaki, with 7 per cent of the children goitrous). The figures were respectively 20 and 35γ. The difference, 15γ, if added to 10 gm. of salt, which can be taken as the approximate intake of an average adult, means 15:10,000,000, or roughly, 1:700,000. The New Zealand iodized salt contains approximately three times this amount, and should sufficiently counteract the dietary deficiency.

As has been already stated, the bulk of iodine excretion is through the urine, which, in a community on an established diet, can be considered to give an approximate clue to the normal intake. von Fellenberg's figures for Kaisten and Hunzenschwil (Table II), considered to be goitrous districts, average 18γ excreted per 24 hours, and for Effingen,

considered to be non-goitrous, 64γ[14]. The difference, 46γ, added to 10 gm. of salt, gives a ratio of very nearly 1:200,000, the actual figure used in Switzerland. Comparison of von Fellenberg's figures for a non-goitrous district in Norway with the average of the four most goitrous districts investigated by Lunde shows respectively 173 and 39γ, giving a difference of 134γ, which, applied to 10 gm. of sodium chloride, gives a ratio of 1:80,000, still far below Canadian and American standards.

von Fellenberg[12] in an experiment of some duration on himself, found that he could maintain equilibrium on 14γ of iodine per day, while 50 to 80γ per day led to a slight retention, easily lost. The first figure corresponds to a ratio of 1:700,000, and 50γ to a ration of 1:200,000.

The American figure of 1:5000 was based on a provision of 400 mg. per year, this being the amount a child would get by taking 10 mg. in tablet form once a week for 40 weeks, the estimated intake of salt being 7.5 gm. per day. Our knowledge of iodine secretion suggests that such a method of administration is most wasteful, the great part of the weekly dose being immediately excreted; small daily amounts are much more likely to be economically utilized and the thyroid supply maintained at lessened intake.

The universally good results reported from the use of the Swiss iodized salt, some of which have been referred to, along with the experimental evidence just adduced, suggest that the Swiss and New Zealand proportions are of the right order, and that a dosage such as that employed in Canada (1:10,000) is far too high. Whether the Swiss figure (1:200,000) is the absolute optimum is a matter for further deliberation.

We must not forget that there is certain evidence, not to be ignored, that under stress of various kinds, perhaps a bacterial infection, an increased intake of iodide may prevent the development of a goitre which would otherwise ensue, so that it is not desirable to employ the absolute minimum deducible from experiments on normal individuals, but rather to select a slightly higher ratio.

(von Fellenberg has developed a satisfactory test for iodized salt[11] and has investigated loss of iodine from long storage[13]. Johnson and Herrington[31] state that while exposure to sunlight results in considerable loss of iodine, in absence of sunlight no serious loss occurs.)

If it be agreed that iodization of salt is the most satisfactory means of prophylaxis, then we should further consider whether this is to be left optional to the individual, or whether, in the interests of the community, compulsion should be employed. There at once arises the question of the danger to certain goitrous adults from such a procedure.

It has been generally recognized, from the time since Coindet first used iodine in the treatment of goitre, until Kocher again stressed the point in 1910[40] that *overdosage* of iodine may induce in a non-toxic goitre a marked hyperthyroid condition. It by no means follows, although the assumption is too commonly made, that the use of a properly iodized table salt will lead to such hyperthyroidism. Earlier

opinions have been quoted by Marine[47] and by Kimball[37, 38]. Among the more recent the following have been selected as representing both sides of the question:

Marine[47]: "The use of iodine in not more than 1 mg. per individual per day is in my opinion not associated with any noteworthy dangers. Occasionally iodism may be observed. . . . . It is of such rare occurrence that attempts to administer iodine in a form which would not cause iodism may be neglected until the susceptible individuals have been determined. It is possible, though improbable, that cases of early Graves' disease may be aggravated by the administration even of these small amounts of iodine. Most if not all the instances of the alleged production of Graves' disease by the use of iodine that have appeared in the literature have been due to the gross abuse of iodine or desiccated thyroid alone or combined."

Kimball[37] concludes from observations on goitrous adults in three different communities, comparing cases of hyperthyroidism that have used, and have not used iodized salt, that there is no basis for the statement that iodized salt can induce hyperthyroidism in long standing goitres, and believes that surgeons are predisposed to neglect the ordinary predisposing factors in cases known to have taken iodized salt. Elsewhere[38] he states: "We have never seen an authentic case of hyperthyroidism in children that could by any stretch of the imagination be attributed to the prophylaxis of goitre through the schools. This point seems agreed on by all."

Plummer[52] considers that the small doses of iodine contained in iodized salt are not materially increasing the incidence of hyperthyroidism in adults who have adenomatous goitre.

Hanzlik, Talbot, and Gibson[19] remark: "The objections that have been raised against the prolonged administration of iodide in small doses are conspicuously unsupported by trustworthy evidence. The alleged deleterious effects are not clearly defined. The disturbing effects sometimes attributed to the use of iodide in the treatment of the abnormalities of the thyroid may be due to the disease and not to the iodide."

The above remarks all emanate from writers in a country in which the iodide content of iodized salt is almost certainly unnecessarily much too large. With them may be contrasted a series of views, either adverse, or more cautious:

Hartsock[24] ventured the opinion that the indiscriminate use of iodized salt may produce hyperthyroidism, especially in adults.

Jones[32] mentions several definite cases in which a goitre became toxic following marked ingestion of potassium iodide, and, much more important to the present enquiry, has given details of three cases in which ingestion of iodized salt (1:5000) led to symptoms of hyperthyroidism.

The following extracts are taken from the Report of the International Conference on Goitre.

"It seems, at all events, to have been demonstrated that with some subjects, predisposed no doubt by a specific idiosyncrasy, the ingestion of a certain quantity of iodine, be it even in as minute a proportion as that contained in our iodized salt (5 mg. per kilo) may provoke the emergence of a symptomatic complex analogous to the symptoms accompanying Basedow goitre." (Carrière, p. XXVII.)

"Whereas incredible quantities of iodine can be borne without any thyrotoxic disturbance by most individuals who have normal thyroid glands, with goitre sufferers it frequently happens that daily doses of 0.5 to 1 mg. develop iodine-Basedow, which will last for months if not even for years. . . . But it is also a fact that the struma Basedowica produced by iodine affects only a small

percentage of the goitre sufferers who are taking iodine. Hence we must assume here also an individual predisposition." (F. de Quervain, p. 137.)

"In endemic goitre districts we call "iodine-Basedow" the cases of primarily atoxic goitre which become toxic after small or large doses of iodine. . . . In those cases histological examination always reveals a more or less advanced "Basedowification." We do not believe that this is always caused by iodine, because we generally find in primarily atoxic endemic goitre, after iodine treatment, degenerative and inflammatory processes (cysts, haemorrhages). In any case the "*post* iodine" is not always a "*propter* iodine." In our endemic goitre we observe not very rarely a "Basedowification" without knowing its cause. When it takes place the goitre grows and the patient takes iodine—like all goitrous people in Switzerland—with or without consulting a physician. If iodine is taken in the usual small doses, or—and this seems to be more important—if the iodine administration is frequently interrupted (administration once or twice weekly) serious toxic symptoms may appear." (F. Merke, p. 239.)

"We have observed quite frequently the appearance of types of secondary hyperthyroidism in endemic goitre. Sometimes they appear spontaneously, especially during the critical period, *but almost always they are due to exaggerated cures of thyroidin, or iodine, or its derivatives*, which had been dispensed as a treatment of goitre itself, or for other reasons, principally against obesity. . . . Of 1,789 cases of hyperthyroidism observed from 1915 to July 1927, 397 can be classed in the group of Basedowified goitres and among these 201 are cases of endemic goitre, which had been treated with improper doses of iodine preparations especially of the tincture. . . . . *We have noticed these symptoms only in the cases that had been treated with enormous quantities of iodine, and never in the cases where judicious doses were dispensed, or some preparation of iodized kitchen salt.* (Marañon, Madrid, p. 365.)

"Whether the iodine dose contained in the complete salt (Swiss iodized salt) is small enough so that no injurious consequences are brought about cannot be answered in the affirmative. De Quervain emphasized the possibility . . . . that there are some individuals who are not able to endure even this dose, and such cases were actually discovered later by observers whose reliability cannot be questioned. The number of such cases has been greatly exaggerated, however, by many parties, who on principle take a negative stand against prophylaxis with complete salt. . . . . It is nevertheless a fact that individual authenticated iodine injuries have occurred through the use of complete salt only. . . . . The Swiss official enquiries (show) . . . . that they appear spontaneously only very slightly more frequently than such so-called thyrotoxicoses occur with a population that does not consume complete salt." (von Jauregg, p. 448.)

von Jauregg points out that such rare instances are scarcely an argument against the compulsory iodization of salt, since it would be as justifiable to demand limitations in the sale of bread or of common salt, because they respectively are injurious to diabetics and nephritics.

Admitted that there be some slight potential danger to goitrous adults, the unbiased observer seems forced to agree with Kimball[38] that "The fear of possible danger to a few seems to carry more weight than the evidence of benefit to the many." It seems to me that the Public Health expert cannot give way in this matter and must press for the general use of the best method of prevention, the extended use of iodized salt in all districts where endemic goitre is prevalent—and this applies to a large part of Canada. While we may not entirely agree

with Kimball that it may be possible to banish the condition in one generation, yet we may reasonably hope that by such means a somewhat longer time will produce this desirable result. And, if the studies of McClendon and Hathaway[46] compiled from the Draft Board Statistics of the U.S. Army have any significance, since they show that the incidence of exophthalmic goitre throughout the United States is proportional in every locality to that of endemic goitre, they indicate that with the banishing of the latter we may expect at least a decrease in the incidence of Graves' disease.

COMPULSORY IODIZATION OF SALT

What should, in the light of the foregoing, be said concerning the compulsory use of iodized salt? There is overwhelming evidence that this salt would, if its use were compulsory, in time practically banish endemic goitre from communities using it. There is some slight evidence, by no means perfect, that a very small percentage of non-toxic goitres may develop a hyperthyroid condition through the use of the salt. Compulsory use will therefore produce great good and little harm. If use is left to the caprice of a mass of individuals, of varying intelligence, less good, and probably not much less harm, will accrue.

It is an especial peculiarity of the Anglo-Saxon race that its communities frequently permit themselves to be hampered in applying preventive legislation by the ignorant clamour of small minorities, generally led by quacks or fanatics, or both. This is well exemplified by the history of vaccination in Great Britain. It is singularly unfortunate that Anglo-Saxon communities, which claim to be the most enlightened in the world, require a semi-political education whenever matters concerning hygienic or prophylactic measures, let alone control of irregular medical cults, come within the power of the vote. Less enlightened peoples, under a reasonably intelligent autocracy, can frequently be benefitted more easily by the fruits of scientific enquiries.

Recognizing the peculiarity of our racial temperament we shall perhaps achieve an easier solution by aiming, wherever goitre is endemic, at that degree of compulsion proposed by von Jauregg (I.C.G., p. 450), in which all salt sold under usual conditions would be iodized, and non-iodized salt would require to be specially asked for, and perhaps only sold by special vendors (pharmacists). As von Jauregg remarks: "Free-will will thereby be maintained in the power to refuse to use iodized salt." Any legislative measures that can be instituted might well include regulation of the traffic in iodine and thyroid preparations, a well-recognized potent source of evil in thyroid conditions, to which the Swiss authorities are continually drawing attention.

GOITRE IN DOMESTIC ANIMALS

This paper has dealt but incidentally with goitre in animals other than man. Nevertheless iodine prophylaxis is equally important for domestic and other animals. The striking results from its use in

hatcheries have been referred to; the treatment is now widespread. Marine advocated its use in treating endemic sheep goitre in the St. Clair flats about Detroit; the usual good results were obtained. Hercus, Benson and Carter[25] mention that in one New Zealand farm where as many as 39 calves had had to be destroyed in one year on account of congenital goitre, allowing the cattle access to rock-salt containing only 14 parts of iodine per 10 millions eradicated the disease. Keith[33] has reported the striking beneficial results to both man and animals in the Pemberton Valley, B.C., through an intelligent farmer applying to Marine for advice and acting upon it. A number of the conditions met with amongst domestic birds and animals in the valley were unusual and not at first sight associable with endemic goitre. Nor was the celebrated hairless pig disease of Montana (and other western districts), although investigation showed that this was not only associated with congenital goitre due to iodine deficiency during gestation (although perhaps some other factors were involved), but also that it could be in large part removed by adding iodide to the ration of the pregnant sow (57, 23). Veterinary pathologists might be well advised to consider such unexpected associations as possible in other still unexplained animal diseases.

SUMMARY

Evidence has been adduced that there is a close relationship between deficiency of iodine in the diet and the occurrence of simple endemic goitre, and that such a deficiency leads to the goitre.

A review has been given of the strikingly beneficial results already obtained through the use of iodine prophylaxis in the prevention of goitre in children.

Other possible causes of endemic goitre have been discussed. There is strong evidence that in certain regions a water-borne infection is a predisposing factor, but this probably acts through an effect on iodine metabolism.

It is concluded that iodized salt is the best medium for iodine prophylaxis. The amount of iodide added, in Canadian iodized salt, seems unnecessarily great, and is perhaps 10 to 20 times greater than necessary. The optimum addition is still a matter for discussion.

Certain views have been quoted which suggest that the use of such iodized salt is potentially dangerous for adult (non-toxic) goitrous individuals. The evidence is frequently open to criticism, and gravely exaggerated. It cannot be entirely dismissed, and further unbiased examination of the question is desirable.

Nevertheless, in any case, as a community measure, in order to eradicate endemic goitre, the use of iodized salt should be made as compulsory as possible.

It is suggested, following the view of von Jauregg, that in all regions where goitre is endemic, all salt sold commercially for table and culinary purposes should be iodized, but that non-iodized salt should be procurable under restricted conditions.

It is pointed out the whole problem applies to domestic and other animals, as well as to man.

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A large number of references to and quotations from papers contributed to the First International Conference on Goitre (Berne, 1927) are indicated in the text within parentheses under the initials "I.C.G.," with a page number. The English edition of the Report, published in 1929 and edited by the Swiss Goitre Commission, has been employed. A very few textual alterations seemed necessary.

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The Trend of Diabetes in Ontario 1879-1929*

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THE discovery of insulin in 1921, with its increasing use since that time, has stimulated interest in the number of deaths from diabetes. More particularly is this so in the Province of Ontario where since 1923 there has been free distribution of insulin, through the Department of Health, to those who, upon the certificate of a physician, are unable to pay for it. In this communication the general trend of the diabetes mortality rate in Ontario (as exhibited by vital statistics returns) for the past fifty years is shown and differences in the rate in various parts of that period and in various age and sex groups are discussed.

The findings from this examination of the Ontario data are very similar to those reported for an insured population[1] and for Victoria, Australia,[2] namely, that in spite of an increasing crude rate, there is a definite decrease in the rates for the younger age groups (under 50), and the increase in the older age groups is greater for females than for males. Support is given to the contention[1,2] that rates of different periods should not be compared without due consideration of certain influences to which the rates are subject.

The general diabetes death rates per 100,000 population for the years 1879 to 1928 inclusive, are shown in table I† and diagram I. Data for the four years, 1887 to 1890 inclusive, are not available as diabetes deaths were not tabulated separately in the mortality returns in those years. The lowest rate recorded was 2.7 per 100,000 in 1881, the highest 13.8 in 1927. The diagram shows a general trend upward, marked by small irregularities. The rate of increase was apparently more rapid in the earlier twenty-five years than the later half of the period and was most rapid in the five-year period, 1896-1900, at which time the diabetes deaths increased to 9.1 per 100,000. The rates remained practically stationary for the next decade, but since 1910, *i.e.* for the last eighteen years under consideration, have shown a gradual increase with slight irregularities. The average rate for this latter period of eighteen years was 11.7—the lowest, 10.4 in 1912, the highest 13.8 in 1927. It is possible that part of the increase in the crude rate

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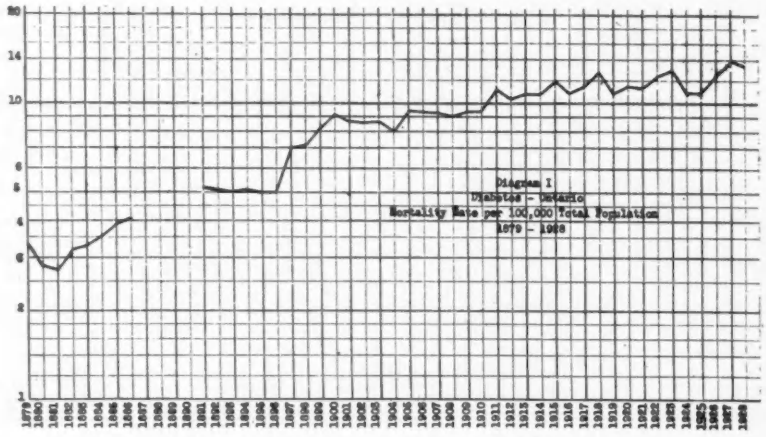
†*Tables are published in the reprint of the article.*

may be accounted for by changes in the age distribution of the population in Ontario in the period under review. That this does not account for all the increase is evident when specific rates for age groups are calculated and examined as shown on page 555.

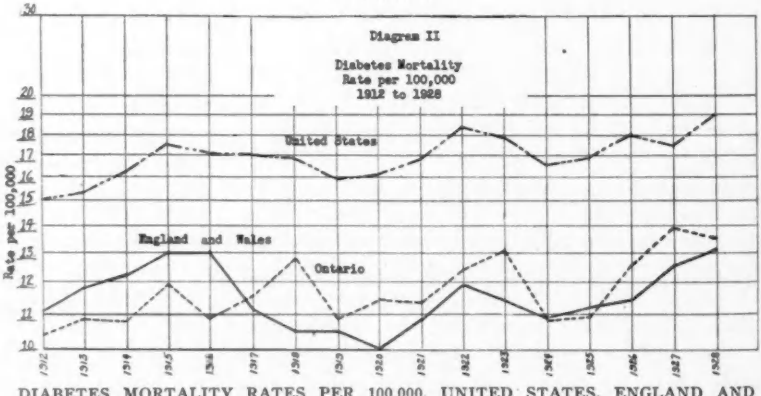
DIAGRAM I



DIABETES, ONTARIO— MORTALITY RATE PER 100,000 TOTAL POPULATION 1879-1928

The Ontario rates in general are much lower (approximately 1/3) than the rates for the United States as shown in diagram II, for the period 1912-1928 inclusive, but appear to be increasing slightly faster.

DIAGRAM II



DIABETES MORTALITY RATES PER 100,000, UNITED STATES, ENGLAND AND WALES, ONTARIO, 1912-1928

Since 1917, with the exception of the years 1924 and 1925, the Ontario rates have been higher than the rates of England and Wales. (For a true comparison of the rates in different countries, standardization of

the crude rates would be necessary to remove the influence of differences in age distribution.) There is a notable tendency for the three series of rates to rise and fall in the same period. It is significant to note here, as pointed out in reference[1], that insulin was introduced in the treatment of diabetes at a time when, judging from previous experience, the rate was not only high but the trend was distinctly upward.

DISCUSSION

Various explanations, such as better times, richer diets, greater sugar content in diet, etc., have been offered for the increasing rate, but the most reasonable one is that the increase is to some extent only apparent and is due to increased accuracy in diagnosis[1]. In order to compare fairly the rates of the present with the rates of the past, it is necessary to take into consideration the changing conditions under which the rates were established.

Although sugar was found in the urine of diabetics as early as 1684, by Willis, the tests used for its detection until quite recent years were uncertain or impractical. Tasting is the only specific test given in Cullen's Medicine, Edinburgh, of 1791. According to Elliotson's Principles and Practices of Medicine, London, 1839, the presence of sugar was detected by the high specific gravity, light colour and sweetish odour of the urine. Tasting (by the patient if necessary), evaporating to dryness and tasting, and acid fermentation on standing are given as the specific tests. By 1871, when Watson published his Lectures on the Principles and Practice of Physic, the following tests had been added: Moore's test—*i.e.* a claret colour produced by boiling equal parts of urine and liq. potassiae; Trommer's test, using copper sulphate and liq. potassiae; and its modification by the addition of potassium tartrate for which Watson gives credit to Pavy. But apparently fermentation with yeast—"on the mantel in winter and in the sunshine in summer"—was the popular test. Although Austin Flint, in his text book in 1879, details Fehling's test as well as the yeast fermentation test, in a later volume, 1886, he appears to give the preference to the fermentation test. In 1886 he indicates that more cases were being diagnosed than formerly but he suggests that the increase might be attributed in some degree at least to increased activity on the part of physicians in looking for cases. The very slow development and acceptance of a rapid practical test is reflected in these references. Knowledge in this regard, as in others, spread slowly and was assimilated slowly. Its application suffered accordingly. Even to-day, with the increased incentive and improved facilities for such testing, it is sometimes neglected.

In the description of the clinical picture of diabetes appearing in the standard textbooks of various periods it is evident that the clinical conception of the disease has been subject to great change. In the earlier books, the great quantity of urine and sugar, the sweet odour of

the breath, the emaciation, the formation of cataracts, etc., were the usual diagnostic criteria. These are now recognized as belonging to later stages of the disease. The following quotation is from the 1839 volume already referred to: "This disease may last many years; and it may prove fatal by phthisis;—that is to say, it may induce phthisis, or be followed by it. Express the fact in any way you choose—diabetic patients frequently die phthisical. They sometimes die from mere exhaustion, occasioned by the disease; and sometimes they die suddenly; but the most common terminations are phthisis, and mere exhaustion. It may destroy a patient in a year or two, or it may remit; and I believe it may cease, or be cured. Dr. Gregory used to say that he knew a case, where saccharine quality of the urine ceased in two days, and did not return; but whether the observations were made with all the accuracy that we require, in modern times, I do not know." It is evident that at that time there existed, if not a great confusion with tuberculosis, a very inadequate clinical knowledge, so we would consider now, of diabetes and of tuberculosis and other diseases. As tuberculosis was rampant at that time, it is impossible at this long interval to estimate at all accurately the relative importance of that disease and diabetes in the deaths in which they were supposed to be associated. It is to be noted that coma is not mentioned unless "exhaustion" refers to it. In his text book of 1871, Watson quotes two post-mortem reports of his own cases to prove that the association of diabetes and phthisis is not always observed, though, he says "some persons have thought it universal." In the 42 years that intervened between the publication of these books, clinical knowledge had not increased sufficiently to dispel that confusion. Again there is no description which can be interpreted as indicating recognition of coma, although the association with carbuncles, boils, pruritus, cataract and gangrene is noted. Austin Flint, in 1879, makes no mention of coma, but in his volume of 1886 he states: "By far the most important of the nervous symptoms of diabetes are those which have been embraced under the name of diabetic coma," and there follows a very fine account of coma and its onset. When no mention of typical diabetic coma is made in a text book of high reputation published in the first year for which the rates are included in this communication, it is reasonable to suppose that many years elapsed before knowledge of that and other conditions associated with diabetes permeated thoroughly to the profession in general.

Apart from the increase in knowledge of the medical profession, other developments have assisted in the recognition of diabetes. Examinations for life insurance have increased tremendously in the past fifty years. How many cases of diabetes have been diagnosed by the required urinalysis which might have been missed otherwise, it is impossible to estimate, but the number is probably significant. To-day periodic health examinations and an enlightened public are added means of bringing cases to the crucial diagnostic test.

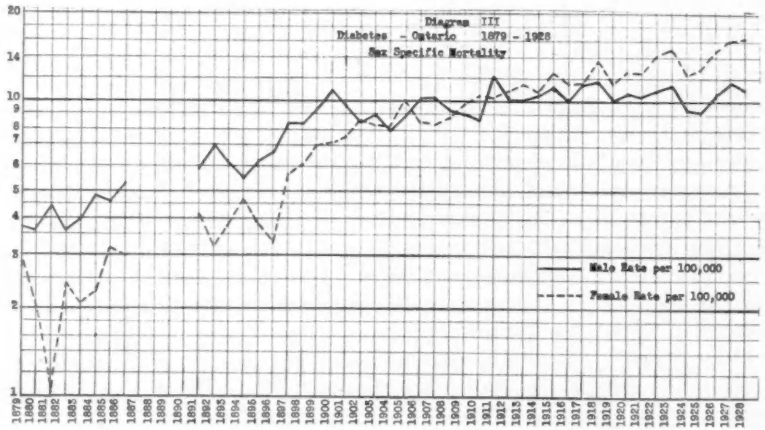
The fact that diabetes in the past was regarded as practically hopeless, so that the dictum "once diabetes always diabetes," prevailed, has had a definite influence on the tabulation and compilation of deaths by the central authority for statistical reports. When two causes of death are stated on the physician's death certificate, one of the causes being diabetes, diabetes is tabulated as the *primary* cause except when associated with such conditions as pulmonary tuberculosis, lobar pneumonia, angina pectoris, cancer, intestinal obstruction, aneurysm, erysipelas and other acute infections. Diabetes is given precedence over such associated causes as myocarditis, chronic nephritis, cardiovascular-renal disease, arterioscelerosis, cerebral hemorrhage and apoplexy irrespective of whether or not the physician considered the diabetes of secondary importance. While the tabulations are made according to established well-defined principles (Manual or Index of Joint Causes of Death) these vary slightly in different countries. With the shifting, or apparent shifting, of diabetes deaths to later age groups so that 50 per cent of them are now supplied by the age group of 60 and over and 30 per cent by the age group of 70 and over, a much larger part of the deaths attributed to diabetes have come to be associated with the group of degenerative diseases, which by themselves, constitute the leading causes of death in the 60 and over age group. Although such deaths when associated in any way with glycosuria, are attributed to diabetes, in very many cases it is by no means the decisive factor, as these deaths are prone to occur when no trace of diabetes is associated. Clinical medicine has long recognized the relative benignity of diabetes in older people. It would appear, therefore, that, with the increase in crude rate supplied largely by the deaths in the older age groups, progressively more deaths have been attributed statistically to diabetes, though clinically not due to diabetes, than was the case when a larger percentage of the diabetes deaths occurred in the younger age groups. The importance of careful examination of both primary and secondary causes in order to get an accurate conception of the conditions is attested by the recent publication of the Bureau of Statistics, Ottawa—"The Contributory Causes of Death for 1926"—an invaluable compilation of any study of the real causes of death. As Joslin has pointed out, a time will come when diabetes will be tabulated as a secondary cause in many conditions in which it now is tabulated as the primary cause.

The Factor of Sex

The sex-specific death rates for the fifty years, 1879 to 1928, omitting 1887-1890 for reasons already stated, are shown in table II and diagram III. The diagram shows that from 1879 to 1902, the rates for males were higher than those for females; from 1903 to 1911 the rates were approximately equal, but from 1912 to 1928 the rates for females have been definitely higher than those for males and their rate of

increase has been greater. In fact, since 1911 the rates for males have fluctuated from 9.2 to 12.1, with an average of 10.7, while the rates for females varied from 10.2 to 16.3, with an average of 12.8. Has the proportion of female deaths to male deaths from diabetes really changed as these lines indicate, and if it has, is there an explanation for it? Have the facilities of ante-natal work with regular urinalysis been a factor of any significance in labelling a case and therefore a death as diabetic? Has the broader life of woman of recent years brought her to a state where her condition receives more attention by which better diagnosis is obtained? As a possible explanation of part of the increase in the rates for females the argument has been advanced that the

DIAGRAM III



DIABETES, ONTARIO—1879-1928—SEX SPECIFIC MORTALITY RATES

economic and social status of women all over the world has been immensely improved and with their better living conditions have come fuller diets with consequently more diabetes.[1]

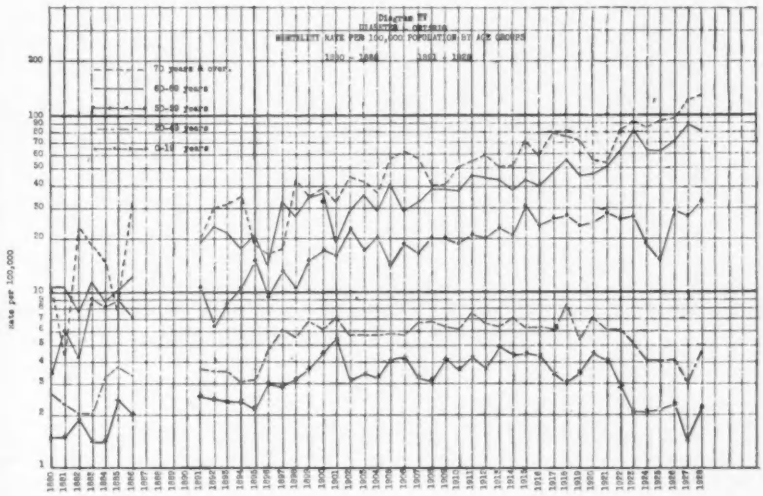
The Factor of Age

It is at once apparent from table III and diagram IV that the age groups under 50 years have not contributed to the increase in the general rate. Since 1922 the rates for these younger age groups have shown a marked decrease, the rate for age groups 0-19 falling to points lower than any seen in the previous 25 years. The rates in the group 50-59 years show a gradual increase. For the group 60 years and over the rates have steadily increased, the increase being greater in the older-age periods.

The increase in the rates for the older age groups while the rates in the younger age groups at first became stationary, and since the use of insulin fell, is shown in the changed proportions of the diabetes deaths

supplied by these two groups. Table IV and diagram V show the percentage of diabetes deaths supplied by each of these groups in each year since 1890. In the early years, 1891-1900, there was considerable irregularity in the percentages supplied by these two groups, the under 50 years group supplying at least 50 per cent of the deaths. Flint, in his volume of 1886, states: "In the vast majority of cases of diabetes the age is between thirty and fifty years. The disease occurs in infancy, youth and advanced life, but instances are rare." It is difficult to say in which group, under 30 or over 50, cases were more apt to be missed through lack of examination and inaccuracies in diagnosis. One can

DIAGRAM IV

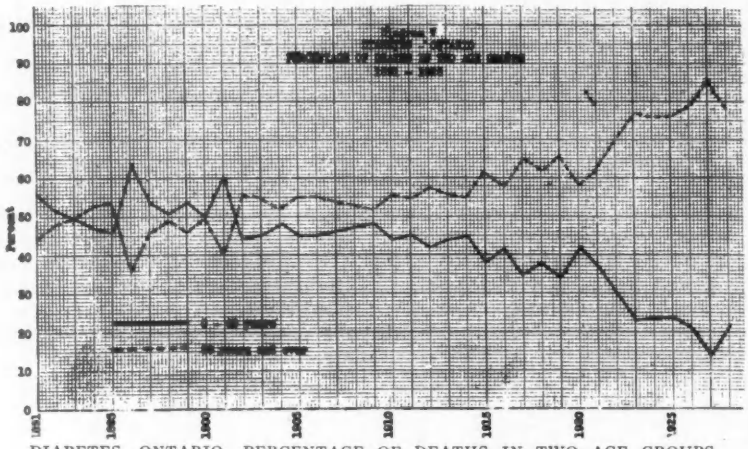


DIABETES, ONTARIO—AGE SPECIFIC MORTALITY RATES, 1880-1886, 1891-1928

only accept, therefore, Flint's estimate which is fairly well supported by these data. Since 1901, however, the group under 50 has, according to these data, supplied consistently less than fifty per cent, the age group of 50 and over supplying more than 50 per cent. The difference was not great in the first decade of this century, but since 1910, with small irregularities, is progressively more marked from year to year. Greater divergence is noticeable after 1914, but the marked change, much more precipitate and more sustained than earlier changes, has been since 1921. This sudden and sustained change, strongly suggests that some factor other than chance has been responsible for either preventing diabetes in those under 50 years of age or postponing deaths till after 50 years of age. There is nothing to suggest that the first consideration, that of preventing diabetes, is tenable. There is, however, evidence to substantiate the latter consideration that deaths are post-

poned, the change being coincident with the use of insulin which, it is established, reduces the case-fatality and postpones death. This shifting of the deaths in diabetes and the reduction, since 1922, in the

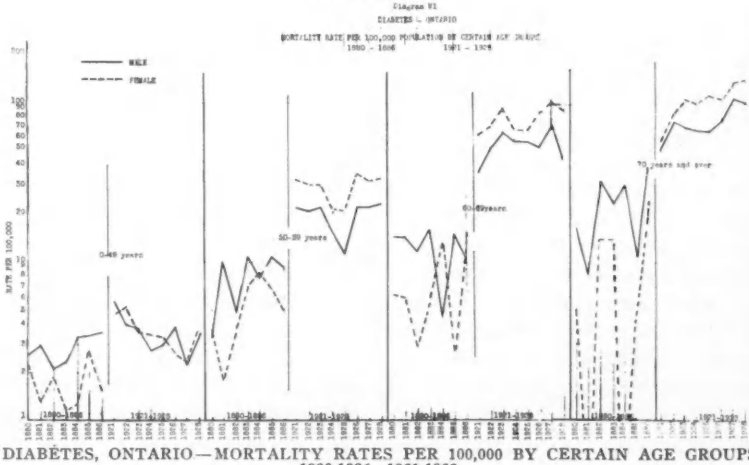
DIAGRAM V



DIABETES, ONTARIO—PERCENTAGE OF DEATHS IN TWO AGE GROUPS, 0-49 YEARS, 50 YEARS AND OVER, 1891-1928

death rate under 50 years of age can be fairly attributed to the use of insulin.

DIAGRAM VI



DIABETES, ONTARIO—MORTALITY RATES PER 100,000 BY CERTAIN AGE GROUPS. 1880-1886, 1921-1928

For a study of the two factors, age and sex combined, the information is available only for two rather short periods, 1880-1886 and 1921-1928. Table V and diagram VI show that from 1880 to 1886, in both

the younger and older age groups, the rates for males were higher than the rates for females, and the rate for males appears to have been increasing more rapidly. The rates for this early period cannot be relied on to any great extent, owing not only to probable inaccuracies, differences between the two sexes in the facility of diagnosis, etc., but also to the paucity of the figures which explains, too, the extreme fluctuations. For the period from 1921 to 1928 the rates for males and for females in the group under 50 years of age are approximately equal and both show a substantial decrease since 1922. For the group over 50 years of age the female rate is higher and in the group 70 years and over it is increasing at a faster rate than the rate for males. No satisfactory explanation of this phenomenon is offered at present.

The decrease in the diabetic death rates in both sexes under 50 years of age is the most striking finding in this analysis and is confirmatory evidence of the influence of insulin.

SUMMARY

I. Diabetes death rates, as exhibited in vital statistics returns, in Ontario, have shown an upward trend during the past 50 years.

II. Evidence is given to support the contention that the increase is more apparent than real.

III. Since 1922 the rates for both sexes for the age group under 50 years have shown a marked decline. This decline is confirmatory evidence of the influence of insulin.

REFERENCES

[1]*Statistical Bulletin*, Metropolitan Life Insurance Co. Vol. XI, No. 5.

[2]Downie, E. The Problem of Diabetic Mortality. *Health Bull.*, Victoria, Australia, 1929, July-Sept., pp. 623-9.

MILK-BORNE DISEASES

THE proportion of all typhoid fever traced to milk has been increasing markedly, while for scarlet fever it has been decreasing. Over the period of 34 years, the four diseases considered range themselves by outbreaks in the following order of magnitude: typhoid fever, scarlet fever, septic sore throat, and diphtheria; but by total cases in the following order of magnitude: septic sore throat, typhoid fever, scarlet fever, and diphtheria.—*Milk-Borne Diseases in Massachusetts, 1927-1929*, by George H. Bigelow, M.D., F.A.P.H., and Filip C. Forsbeck, M.D.

An Analysis of 192 Deaths Attributed to Diabetes in Ontario with Special Reference to Insulin

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FROM a study of the mortality attributed to diabetes in Ontario by Ross and McKinnon[1], it is evident that the crude mortality rate has shown a continuous, though irregular, increase during the past fifty years. Emphasis was placed in their discussion of this rising death rate on the necessity of giving due consideration to the improved facilities for diagnosis during the period under review, to better diagnostic ability of physicians, and to the influence on mortality returns of the working hypothesis, "once diabetes, always diabetes." In spite of a reduction in the death rate in the age group under 50, the number of deaths is still surprisingly high, particularly in view of the distribution of a steadily increasing amount of insulin. Since 1923, insulin has been supplied by the Department of Health, Ontario, without charge to patients, certified by physicians as being unable to pay for it, and the total amount distributed in this way or sold has increased from a monthly average of 344,883 units in 1923 to 1,703,108 units in 1929. It is pertinent therefore to seek an explanation.

To obtain information copies of all death certificates on which diabetes was stated as either a primary or contributory cause of death were obtained through the kind co-operation of the Registrar-General's Department, Ontario, during the period, June, 1929, to February, 1930. Copies were received during this period of 320 certificates. A letter requesting information concerning each death was sent by the Department of Epidemiology and Biometrics, School of Hygiene, University of Toronto, to the physician reporting the death. The information requested was set forth in six short questions and no enquiry was made concerning the clinical aspects of the case in regard either to contributory causes of death or to the response of the patient to insulin if so treated. It was asked whether the patient was under regular medical supervision and the duration of the diabetes, if known. Regarding insulin, the desire was to learn whether it was used, the daily amount, the time of its commencement and whether the patient intelligently co-operated. In other words, the desire was to learn how many of the deaths occurred among patients who were properly supervised and treated. The response on the part of the physicians was most generous,

and replies, frequently with additional data, were received regarding 224 cases. The age and sex distribution of these cases is shown in table I.

TABLE I

Age and Sex Distribution of 224 Deaths in which Diabetes was Reported as Cause or as a Contributory Cause, Ontario, 1929

Age	Male	Female	Total	Percentage in each age group
0–19	6	3	9	4.02
20–49	14	12	26	11.61
50–59	15	24	39	17.41
60–69	15	48	63	28.12
70 and over	39	48	87	38.84
All ages	89	135	224	100.00

Nearly 39 per cent of these deaths were in the age group of 70 years and over. If the group 50-69 be added, then over 84 per cent of the deaths in this series fall in the age group of 50 years and over. Table II presents the cause (primary) of death as stated by the physician.

TABLE II

Cause of Death as Stated by the Physician in 224 Cases in which Diabetes was Present

Cause of Death	0–19	20–49	50–69	70 and over	Total
Diabetes, coma, gangrene	9	17	57	40	123
Cardio-vascular renal	0	2	30	31	63
Pneumonia		2	5	5	12
Cancer	0	0	3	4	7
Communicable diseases (other than pneumonia)	0	3	3	3	9
Other causes	0	2	3	5	10
Total	9	26	101	88	224

Of the 224 deaths in which diabetes was reported as the cause or contributory cause, 63 were stated by the physician to be due to cardio-vascular renal conditions and that diabetes was a contributory factor in these. In twelve, pneumonia was given as the cause with diabetes as a contributory factor, and seven were reported as cancer with diabetes as contributory. Only in 123 had the physician recorded diabetes as the cause of death. In other words, almost one-half of the deaths studied were reported by the physicians as being caused by conditions other than diabetes and that, in their opinion, the diabetic condition

was contributory, not primary. Referring to the distribution of these deaths by age groups it is noted that under 50 years of age the deaths are very largely due to diabetes without contributory causes, but over 50 years of age almost fifty per cent of the deaths were reported as due to cardio-vascular, renal and other conditions and that diabetes was a secondary factor. In the annual reports of Vital Statistics, provincial and federal, it is possible only to record one cause for each death. A choice must, therefore, be made by the office of the Dominion Bureau of Statistics of the cause which is to be regarded as primary. Although there is no international agreement, certain rules have been generally accepted as relating to the selection of the primary cause when one or more causes are given. In reference to diabetes (as a primary or secondary cause) the practice in Canada as in other countries is to give it precedence over the majority of contributory causes with the exception of acute communicable diseases, cancer, aneurysm, angina pectoris and puerperal conditions. Through the courtesy of Mr. E. S. Macphail, Superintendent, Dominion Bureau of Statistics, Ottawa, the death certificates of these cases were classified in accordance with the current practice and as a result 32 were attributed to diseases other than diabetes and the remainder, 192, were classified as deaths from diabetes. This practice of giving precedence to diabetes is a reminder of the old conception that diabetes is always fatal. However, of this number which statistically were considered as diabetes, the physicians had given diabetes as the cause in only 120 cases. As this study is concerned with the deaths recorded as diabetes and of the use of insulin in these cases, this paper will be confined to the 192 deaths which have been statistically regarded as diabetes. Table III shows the age and sex distribution of this group.

TABLE III

Age and Sex Distribution of 192 Deaths Statistically Classified as Diabetes, Ontario, 1929

Age	Male	Female	Total	Percentage in each age group
0–19	6	3	9	4.7
20–49	9	10	19	10.0
50–59	14	18	32	16.6
60–69	13	43	56	29.2
70 and over	34	42	76	39.5
All ages	76	116	192	100.0

Age Group 0-19 Years

As shown by Ross and McKinnon[1], in Ontario, by Downie[2], in

Australia, and by the studies of the Metropolitan Life Insurance Company[3] of its claims of policyholders in the United States and Canada, there has been a marked fall in the death rate in this age group since the introduction of insulin. It is, therefore, of interest to study the records of the nine deaths in this age group.

Case No. 6—Age 16, female; patient not previously diagnosed as diabetes, admitted to hospital in unconscious condition, died in diabetic coma on the following day. Insulin was administered a few hours before death.

Case No. 24—Age 8, female; under medical care for one year since diabetes was diagnosed, receiving 20 units daily. Patient died of broncho-pneumonia following an acute illness.

Case No. 44—Age 11, female; patient residing in the country; received 30 units of insulin daily over a period of two years, but was under medical supervision only part of the time. Ten days prior to death, patient discontinued using insulin. Contributory cause of death was acute nephritis, duration three days.

Case No. 60—Age 15, male; rural case, under treatment for five years; using 50 units daily; died in coma. Physician stated that the patient experienced, in an attack of measles, a decided setback about seven months after the commencement of the treatment and never seemed to do so well afterwards.

Case No. 119—Age 8, male; admitted to hospital in semi-conscious condition and died shortly after admission. He suffered an attack of Vincents angina twelve days before his death. This case was not diagnosed as diabetes until hospitalized.

Case No. 130—Age 15, male; rural resident; physician was called to see the patient when in coma. As insulin was not available and had to be obtained from a distant city, the supply arrived too late for use. Patient had been in failing health for three months but parents had not called a physician.

Case No. 174—Age 16, male; rural resident; under treatment for one year. Insulin was not used. Patient would not co-operate in the treatment.

Case No. 188—Age 14, male; was admitted to hospital and returned home with instructions regarding insulin treatment, but did not do well, having frequent "reactions." After some months he was re-admitted to hospital and died suddenly. Contributory cause, pulmonary oedema.

Case No. 215—Age 19, male; rural resident; diabetes diagnosed a few months before death. Patient was young labourer, below par mentally. He refused to co-operate in treatment till shortly before his death. The daily amount of insulin prescribed was 60 units. He improved for a time, but could not be trusted to carry out instructions. Contributory cause was given as septicaemia.

Cases number 6, 119 and 130 were "missed" cases, being first diagnosed when seen in coma. These deaths, constituting one-third of this small group, emphasize the problem of the unrecognized cases of diabetes among children. Two of these three cases were rural residents, and, though in failing health, their parents had not sought the advice of a physician. In the third case the physician was unable to adequately treat the patient as he did not have insulin available. The lesson in this case is obvious—every physician should carry a small supply of insulin to meet possible emergencies. Case number 44 is a grim reminder of the need for training of young diabetics and their parents in the necessity for the continuous use of insulin when insulin is required. Even such a small number of cases shows the danger of intercurrent infections, particularly the communicable diseases of childhood, to young diabetics. Cases number 24 and 60 are examples

which stress this danger. It may not be amiss here to emphasize the importance of protecting young diabetics by active immunization against those diseases for which we have effective means. Particularly is this true of diphtheria. Cases 174 and 215 present the problem of the lack of intelligent co-operation on the part of the patient in making possible adequate treatment.

In analysing the histories of these nine cases, one finds that only two received insulin regularly; one received it occasionally; one discontinued its use after a period of satisfactory regular use; and in three, no insulin was used. Only two of the nine cases received insulin regularly. Three cases, as before stated, were first diagnosed when in coma and is a reminder of the inherent difficulties of finding cases among children and of the placing of them under satisfactory treatment. In older persons, life insurance and other medical examinations are made and undoubtedly account for the finding of many cases in adult life. From the limited information supplied, cases 188 and 215 might be regarded as deaths from hypoglycaemia. The evidence, however, is not sufficient to warrant a conclusion. The possibility of such an occurrence emphasizes the need for the training of patients as to the dangers of the improper use of insulin as well as to the dangers of breaking diet.

Age Group 20-49 Years

The total number of deaths in this age group was nineteen; nine males and ten females. Little difficulty arises in deciding the part played by diabetes in the deaths attributed to it in this group. The certificates record the presence of coma, of multiple abscesses, of carbuncles, of gangrene and of other diabetic complications. The outstanding fact which is evident from a study of these cases is the absence of proper treatment with insulin. In two, insulin treatment was refused; in four others, insulin was used only in the last week or less of the patient's life in an attempt to combat coma; in two, insulin was given very late in the course of the disease, having been commenced within a few weeks of death. In four instances, the physician stated that insulin had been given over a period of months, but that the treatment was most irregular and that the co-operation of the patient, both in regard to diet and insulin administration, was unsatisfactory. Two patients discontinued the use of insulin to seek treatment by irregular practitioners and were seen again by a physician just prior to death. Only in one case of the whole group of nineteen could it be said that the patient had received proper treatment with insulin and had co-operated.

Age Group 50-69 Years

Almost 46 per cent of the deaths attributed to diabetes in this series occurred in this age group. The part played by diabetes as the

causative factor of the death is not evident in a large number of deaths recorded. In 55 only of the 88 deaths in this group was diabetes stated by the physician to be the primary cause. All but three were due to cardio-vascular renal conditions. Coma was recorded in 19 of these as the terminal condition. Of these coma cases, not one received insulin regularly; eight received emergency treatment with insulin, and nine did not receive insulin. Two of the coma cases were foreigners who could not intelligently follow dietary treatment. Of the coma cases three patients had been receiving insulin intermittently but had discontinued treatment and died in coma a few weeks afterwards.

Eight patients in this group of 55 "primary" diabetics were first diagnosed as suffering from diabetes when in a state of coma or advanced gangrene. Twenty-two did not, according to the available reports, receive insulin at any time. In 16 cases, insulin was used only in the last week of the patients' illness. Only nine of the patients had been under insulin treatment for more than two months, and included in this number are several who used insulin very irregularly and who could not be considered as really receiving insulin treatment. Three only of the series of 55 cases received regular treatment with insulin under medical supervision and co-operated intelligently.

Of the 33 deaths in this age group in which diabetes was stated by the physician as a contributory cause, the primary causes were stated as chronic heart disease, apoplexy, arteriosclerosis, nephritis, etc. This group included many cases in which the diabetes was controlled by diet with or without insulin. It is not surprising, therefore, to find that a larger proportion of these patients were receiving proper treatment and co-operating in it. Seven of these 33 patients were using insulin regularly for a considerable period and three others had used it for at least two months preceding death. The deaths occurred as a result of chronic heart disease, apoplexy, etc. In their reports, the physicians have frequently stated that the diabetic condition was not the immediate cause of death as the urine was free from sugar and the diabetic condition apparently controlled by diet.

In this age group, therefore, of the 88 patients, 53 received insulin at some time during the course of the disease, including 19 who first received it within a few days of their death and 13 who had discontinued its use prior to death. Only ten, however, used insulin regularly for a period exceeding a few months and carried out the treatment satisfactorily according to their physicians' reports.

Age Group 70 and Over

Seventy-six of the 192 deaths in this study occurred in persons of seventy, or more, years of age. Turning to the death certificates in this age group and to the reports of the physicians, one finds that in only 39 was diabetes or its sequelae given as the cause of death. The remaining deaths, 37 in number, as would be expected in this age

group, were stated by the attending physicians as due to cardio-vascular renal conditions, senility, etc. As in the group 50-69 years of age, a very large percentage of these deaths was in persons whose diabetes was considered by the physicians to be mild and not serious. Such patients seldom required insulin. According to the physicians' reports, they were suffering primarily from cardio-vascular renal or other degenerative conditions.

In reference to the portion of this group, 39 in number, whose deaths were stated as primarily due to diabetes, insulin was used in 21, but of these six received it only in the last few days of their illness. In only one case could it be said that the patient was receiving regular diabetic treatment with insulin and was co-operating in the treatment. The remainder of the cases used insulin irregularly or had discontinued and a frequent notation on the report were the words, "would not follow instructions." Not one case of the 14 who died in coma was receiving insulin regularly for even a period of one month before death.

In reference to the use of insulin in the remaining cases of this age group, namely, the 37 cases whose deaths were not attributed primarily to diabetes by the physician, 13 received insulin at some time during the course of the disease, but of this number three had discontinued treatment prior to their fatal illness. Four received it only during the last few days of their life and only four received insulin regularly and co-operated satisfactorily in the treatment.

The relative unimportance of the diabetes in this group is shown by the fact that of the 20 deaths in which chronic heart disease was stated as the cause, 18 had never used insulin. A few of these had refused insulin treatment but the majority were recorded as having had their diabetic condition easily controlled by diet. The following reports are typical of this group:

Male, aged 70; rural resident; *cause of death*,—arteriosclerosis, chronic interstitial nephritis, myocardial failure; *contributory cause*,—diabetes mellitus. "This patient suffered from glycosuria which could well have been controlled by diet. He was put on a diet, but would not adhere to it. I do not feel that the diabetic condition greatly influenced his downward course."

Female, age 70; urban resident; *cause of death*,—nephritis; *contributory cause*,—diabetes mellitus. "Patient suffered from diabetes for ten years; received insulin treatment from April, 1924, and had an intelligent understanding of the use of insulin. Urine continuously free of sugar, blood sugar normal or only slightly elevated. Death due to nephritis."

Male, age 75; rural resident; *cause of death*,—apoplexy; *contributory cause*,—diabetes mellitus. Under regular insulin treatment for several years; death due to apoplexy.

Male, age 85; *cause of death*,—cardiac insufficiency; *contributory cause*,—diabetes; duration 35 years, controlled by diet.

Female, age 76; *cause of death*,—atheroma and myocarditis; *contributory cause*,—diabetes; insulin used for a few months and discontinued as urine became sugar free.

Taking this group of 76 deaths which occurred in persons 70 years and over, it is noted that in 34 of these patients, insulin had been used at some time during the disease; in 8, it had been discontinued; in 10,

it was used just prior to death. In only six was insulin regularly used and controlled by medical care.

The use of insulin in the entire group of 192 deaths attributed to diabetes is shown in figure 1 and by table IV. One hundred and seven

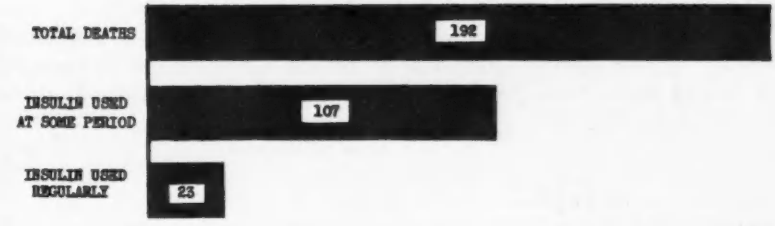
TABLE IV

THE USE OF INSULIN IN 192 CASES OF DIABETES

	Diabetes Stated as Cause				Diabetes as Contributory Cause			
Age Groups	0-19	20-49	50-69	70+	0-19	20-49	50-69	70+
INSULIN USED								
Regularly								
Good Co-operation	1	1	3	1	0	0	7	4
Poor Co-operation	1	1	3	1	0	0	0	0
Occasionally	1	3	3	6	0	1	0	2
1-2 Months Before Death	0	2	2	2	0	0	3	0
1 Week or Less Before Death	2	4	16	6	0	0	3	4
Discontinued								
With Advice	0	0	1	0	0	0	3	1
Without Advice	1	1	5	5	0	1	4	2
INSULIN NOT USED								
Diet Only	0	0	2	0	0	0	6	6
Refused Insulin	2	2	8	5	0	0	1	8
No Record of Use	1	3	12	13	0	0	6	10
Total in Age Groups	9	17	55	39	0	2	33	37
Total	120				72			

FIGURE I

USE OF INSULIN IN 192 CASES OF DIABETES



(56 per cent) of the patients used insulin at some time during the course of the disease, 44 (23 per cent) had commenced treatment within two months of death, but in only 23 (12 per cent) of the 192 cases had insulin been used regularly for a period of more than a few months. It

is interesting to compare the findings in a much larger group of deaths as recorded in the May, 1929, issue of the Statistical Bulletin of the Metropolitan Life Insurance Company. Sixty-three per cent had used insulin, 46 per cent of the insulin-treated patients had commenced its use within one month of death, and 33 per cent of the total number of cases had begun insulin treatment a year or more before death.

The average age at the time of death of the 120 cases in which the primary cause was stated to be diabetes was 58.2 years. The average age of the 54 cases in which cardio-vascular renal conditions were regarded as primary causes was 66.5 years, and of the terminal pneumonia cases, 67 years. This emphasizes the probable part played by cardio-vascular renal conditions and other common causes of death in the older age groups, either as contributory or as primary causes of death, in patients who suffered from glycosuria.

CONCLUSIONS

(*a*) In the study of 192 deaths attributed statistically to diabetes, diabetes was given by the physician as the cause in 120 cases, and in 72 as a contributory cause. It would appear that the statistical inclusion of those cases in which diabetes was only a contributory cause gives an undue prominence and probably an erroneous idea of diabetes as a cause of death, particularly in the older age groups.

(*b*) From the analysis of the use of insulin in this group, 56 per cent of the cases received insulin at some time during the course of the disease. Of the insulin-treated cases, 107 in number, 21 per cent had used insulin regularly for a period longer than a few months, 14 per cent received it irregularly, and the treatment was unsatisfactory in regard to diet also. Eight per cent had commenced treatment within two months of death and 33 per cent during the last week of their illness. Nineteen per cent had discontinued insulin and were not receiving it at the time of death.

Expressed in terms of the total number of diabetes deaths, only 12 per cent had received insulin treatment regularly for a period greater than a few months.

(*c*) There is urgent need for the wider and more intelligent use of insulin. Many deaths, particularly among those under 50 years of age, could have been prevented if the patients had received proper insulin treatment.

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A Note on the Concentration of Scarlatinal Toxin

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ALTHOUGH the concentration of toxin derived from haemolytic streptococci was carried out by Roger[1] as early as 1892, and independently by Laitinen[2] in 1896, no general interest in the subject seems to have been aroused at that time.

Owing to the association of the haemolytic streptococcus with scarlet fever, numerous accounts of the concentration of scarlatinal toxin have appeared in the recent literature. For the most part the methods employed consist in alcohol precipitation[3, 4, 5, 6] or dialysis with or without the addition of ammonium sulphate or sodium chloride[7, 8, 9, 10]; Hartley[10] employed acid precipitation after dialysis, and Huntoon[7] acidified before dialysing.

Rabbits have long been known to be susceptible to streptococcal toxin[11], and, as pointed out by Parish and Okell[12], chinchilla rabbits are particularly sensitive. The dose which they found sufficient to kill rabbits when given intravenously was 20-40 cc.

Using the sterile filtrate from an 18-hour broth culture of the strain, N.Y. 5, of Dochez, we found that rabbits of chinchilla type weighing 2-2.5 kg., could readily be killed in less than twenty-four hours by intravenous doses of 2.5 cc. of toxin per kg. The same dose was required when 48-hour culture filtrates were used, whereas with 6-hour culture filtrates, a dose of 7 cc. per kg. was the least amount which would cause death.

In order to inject some multiple of the lethal dose, it became desirable to use concentrated toxin to avoid introducing too large a volume. For the preparation of the crude toxin, beef infusion broth of pH 7.6, containing 1 per cent Parke-Davis Bacto-peptone, was inoculated with a 24-hour broth culture of N.Y. 5, incubated 18 hours at 37° C., filtered through paper pulp, then through a Berkefeld "N" candle, and tested for sterility. There was surprisingly little variation in the toxicity of different lots of this material.

A slight modification of Hartley's method[10] of concentration in our hands gave a decrease in volume of about 20x with an increase in potency of less than 10x, or loss of about 60 per cent. Cellophane was substituted for collodion in the dialysis, and probably a large part of the loss was due to its excessive permeability.

Pulvertaft's method[6] gave a concentration of 10x with a loss of

50 to 80 per cent in different preparations. The potencies were estimated by determining the minimal lethal dose for rabbits. By either method an insoluble precipitate was sometimes obtained.

A simpler procedure devised by Watson and Wallace[13] for the purification of diphtheria toxin was finally adopted with some modifications. A measured amount of toxin, chilled to 10°C., was acidified to pH 4 by adding 1.5 per cent glacial acetic acid; after standing at 10°C. for two hours or more, the precipitate was thrown down by centrifugalizing and washed once with a buffer solution of sodium acetate and acetic acid at pH 4[14]. The precipitate was then suspended in a small quantity of normal saline, brought into solution by adding sufficient $NaHCO_3$ to bring the pH to 7, passed through a Berkefeld filter and tested for sterility. The precipitate obtained was a grey-brown, rather light, sticky material which dissolved very readily on the addition of alkali. The total nitrogen determined by the Kjeldahl method and the total solids, estimated by evaporating 5 cc. to dryness, did not differ greatly from those of the crude toxin. The results for three preparations are as follows:

Toxin	Unconcentrated		Concentrated		Supernatant	
	Mg. N/cc.	% solids	Mg. N/cc.	% solids	Mg. N/cc.	% solids
S	2.7	3.1	3.0	3.2	.....	.....
U	2.4	2.3	1.7	2.3	1.9	.....
X	3.6	2.4	0.86	1.8	3.1	2.7
Broth used in making toxin X	3.3	2.4	.....	.....	.....	.....

A concentration of 200x could be obtained without difficulty but the yield of toxin was correspondingly poor. Concentrations in volume of 10x, 60x, and 200x gave yields of about 50 per cent, 30 per cent and 20 per cent respectively, as estimated by a determination of the minimal lethal dose for rabbits. With a concentration in volume of 200x the m.l.d. for rabbits usually varied between 0.1 and 0.06 cc. per kg. On estimating the potency by means of skin tests, similar results were obtained but were more difficult to interpret because of the wide variation in the values given by different subjects.

Several factors other than the concentration in volume were found to affect the yield. Precipitates kept at pH 4 from one to three days before neutralization underwent definite deterioration. A Sharples centrifuge was used on three occasions and produced a relatively insoluble precipitate of low toxicity. Several successive failures to obtain a precipitate by the usual procedure were traced to the use of proteose peptone for the toxin broth. The negative results of Shinn[15] with a similar method of acid precipitation might possibly be due to some such cause. The use of decinormal NaOH instead of $NaHCO_3$ did not reduce the yield.

Filtration through a Berkefeld candle, the addition of 0.5 per cent phenol, and centrifugation at room temperature instead of 10°C. were not found to affect the potency sufficiently to be of practical disadvantage, although each of these apparently caused some decrease in toxicity.

The crude toxin was stable for at least eight months, whereas the concentrated material deteriorated rapidly even in the cold. Phenolised concentrated toxin, apart from the initial loss in toxicity, appeared to deteriorate no more rapidly on storage than the same preparation without phenol. Concentrated toxin dried over H_2SO_4 lost about three-quarters of its potency. When dried rapidly in vacuo at 40° C., the loss was not more than one-quarter and appeared unchanged on retesting after twelve weeks.

Toxin concentrated by acid precipitation appeared to have the same properties as crude toxin. The skin reaction could be neutralized by a quantity of scarlet fever antitoxin proportional to the increase in potency of the toxin. Diphtheria and tetanus antitoxin were without neutralizing effect. Rabbits could also be protected from ten lethal doses of concentrated toxin by scarlet fever antitoxin but not by diphtheria antitoxin.

Incubation at 37° C., after the addition of 0.3 to 0.4 per cent formalin, caused a decrease in toxicity which was rapid in the first few days and gradually diminished in the next eight weeks. Complete detoxification was not obtained even after eight months. Concentrated toxin was less stable to heat than crude toxin. Heating to 37° C. for twenty-four hours increased the m.l.d. 5x, indicating a corresponding loss of toxicity. After heating to 56° C. for one hour, up to 30 m.l.d. per kg. could be given without causing the death of the animal. At 97° C. for one hour, 3 m.l.d. produced no symptoms; larger doses were not tried. In each instance a similar reduction in potency was shown by skin tests on rabbits[16] and human subjects.

Six rabbits were given successively increasing doses of concentrated toxin intravenously, beginning with 1/4 m.l.d. Two died when a dose of 1 m.l.d. was reached; the remaining four survived a dose of 4 m.l.d. There was a marked increase in resistance in several animals after a single dose of toxin heated to 56° C. Toxin partially detoxified with formalin also appeared to produce some immunity.

An attempt was made to compare toxin concentrated by precipitation with acetic acid to the "thermolabile" fraction of toxin described by Ando[17]. The "thermostable" fraction precipitated by acid, which he regards as a non-specific nucleo-protein, was assumed by us to be the same as our concentrated material, since the methods of preparation are almost identical.

Toxin concentrated 100x in volume by alcohol precipitation was made from the same crude toxin as was used to prepare toxin concentrated 100x by precipitation with acid. Intravenous injection of the two preparations into rabbits gave the following results:

Toxin	Dose per Kg.	Alcohol precipitate		Acid precipitate	
		No. of rabbits	Died	No. of rabbits	Died
1.....	1 cc.	3	1	4	2
2.....	1 cc.	1	1	1	0
2.....	2 cc.	1	1	1	1
2.....	2 cc. at 97° C. 1 hr.	1	0	1	0
2.....	2 cc.+ 0.5 cc. Antitoxin	1	1 (in 6 days)	1	0
3.....	0.05 cc.	..	..	4	0
	0.1 cc.	6	0	11	5
	0.5 cc.	6	2	1	1
	1.0 cc.	2	1	..	..

These figures suggest that whether the effects of the alcohol and acid precipitates are quantitatively equal or not, they produce qualitatively similar results when injected into susceptible animals.

Skin tests of the same three preparations were made on four groups of rabbits, a total of twenty-eight animals. All tests included controls of precipitate of uninoculated broth of the same dilution as the lowest used in the test. Three animals reacted positively to the alcohol precipitate of broth and were discarded. The remaining twenty-five showed no significant difference in the size or intensity of the reactions caused by the toxin obtained by the two methods, nor could the skin reactions due to acid precipitate neutralized by NaOH be distinguished from those due to similar material neutralized by $NaHCO_3$.

A group of six rabbits injected intradermally with toxin-antitoxin mixtures showed that toxin precipitated with alcohol was completely neutralized by an equal dilution of antitoxin. Negative reactions were shown to both alcohol and acid precipitates after heating to 95° C. for one hour; the reactions to the unheated controls were strongly positive.

Two preparations of toxin precipitated by alcohol were tested on one Dick-negative and two Dick-positive human adults. All three gave positive reactions, which were only somewhat diminished in size after heating to 95° C. for 1/2 hour, to 56° C. for twenty-four hours, and to 37° C. for seven days. The alcohol precipitate of uninoculated broth, used as a control, gave a positive reaction in the Dick-negative subject but not in the two Dick-positives. These results are in agreement with a recent preliminary report by Ando and Kurauchi[18], who found positive reactions to toxin precipitated with alcohol and heated to 97° C. for one hour, among both Dick-positive and Dick-negative subjects.

These investigators now consider about one-tenth of the purified toxin to be heat-stable. They have also previously pointed out that it is not completely separated from the non-specific nucleo-protein by alcohol precipitation.

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CANADIAN TUBERCULOSIS ASSOCIATION

CHRISTMAS SEALS

When a Feller Needs a Friend

The Canadian Tuberculosis Association is to be congratulated on the distribution of a most attractive Christmas seal this year. The seal has the cheery figure of Santa Claus bedecked with snow and brightened with seasonable red. The sale has been most efficiently organized, and each local committee is making a real effort to exceed the returns of last year.

Editorials

SIMPLE GOITRE

THE findings of Marine and the observations of Kimball, some ten years ago, as to the prevalence of so-called "simple goitre" and the apparent relationship existing between this condition and an inadequate iodine intake, stimulated interest in the question of the possible lessening of the incidence of this condition.

This interest was general in both the United States and Canada and was manifested not only by physicians and public health workers, but by a large mass of the socially-minded people in those parts of the country in which goitre was noted as being markedly present. Surveys to establish the age group most affected and the extent to which it was prevalent were held in many communities.

The disease being apparently preventable, the responsibility for its prevention was delegated to the health authorities. Unfortunately, it was not possible to arouse as much public interest in its prevention as its cure; some health departments, rightly or wrongly, assumed the responsibility for treatment of those already affected.

Goitre was found to be much more prevalent in some areas of Canada than in others. In certain mountainous sections in British Columbia and Alberta, it was extremely common. In Manitoba, the condition was found to occur with pronounced frequency among the school age group in certain districts. Along the north shore of Lake Superior, Northern Ontario, and in Haliburton and Eastern Muskoka, goitre was found in from 20-35 per cent of school children. Prophylactic treatment was established in many of the centres following such surveys, and the presumption that a lack of iodine in the underlying rock formation limited the available supply for human consumption, was apparently accepted. The conclusions brought down by investigating groups, irrespective of where they had worked, were largely the same; namely, that there is an evident difference in the susceptibility of certain races; that boys and girls are equally affected up to 12 years of age, after which age, girls are more frequently affected; that the condition answers readily, in the vast majority of instances, to treatment with iodine, and that the problem of elimination of goitre is one which is of sufficient moment to engage the attention of all those in a position to contribute anything to the solution of the problem.

Despite these conclusions, there was doubt in the minds of many as to,—first, the possible contribution to goitre made by other factors than iodine deficiency; second, the possible effect of the promiscuous inclusion of additional quantities of iodine in the diet of presumed

normal individuals; third, the relationship between endemic goitre and the major affections of the thyroid; namely, toxic adenomate, and exophthalmic goitre. These questions are still unanswered in the opinion of many. Public interest has materially waned in the problem, despite the fact that simple goitre is still prevalent in the same goitrous districts, and that health authorities are still apparently charged with its prevention.

The article by Dr. Cameron in this issue of the JOURNAL will be welcomed by all JOURNAL readers.

THE PROBLEM OF DIABETES

THE experience of the past ten years has proven conclusively that diabetes can be controlled by insulin. In spite of that fact, data from various sources indicate that the crude mortality rate from diabetes is rising. That this rising rate does not give a true picture of the diabetes mortality problem is shown in an analysis of Ontario data for the past 50 years.[1] This study shows that the death rate in the age group under 50 is definitely decreasing since the introduction of insulin.

While the decrease in deaths of those under 50 years of age is gratifying, it is by no means satisfactory. In 1928, 95 deaths in the age group under 50 were attributed to diabetes.

The answer to the question as to why these deaths occurred is found in an analysis of replies to questionnaires sent to the physicians reporting deaths[2] directly or indirectly associated with diabetes in Ontario. It is painfully evident that insulin was not used or used inadequately or inefficiently in the majority of the cases. In nine cases under 20 years of age, the majority dying of diabetic coma, insulin had been used regularly and with satisfactory co-operation and under supervision, in only two of the cases. The other deaths tell a similar story.

These untimely deaths indicate that the necessity for public health education to the end that not only will a physician be called very early in disease but that his treatment will be carried out with intelligent co-operation and perseverance. There must be provided means for adequately caring for and training diabetics. There must be facilities enabling physicians to keep abreast of the technical details required for treatment.

The consideration of these problems by the central public health authorities is required if satisfactory results are to be obtained in the treatment of diabetes.

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PUBLIC HEALTH NURSING

RUBY M. SIMPSON, Reg.N., and FLORENCE H. M. EMORY, Reg.N.

THE VICTORIAN ORDER OF NURSES—NUTRITION WORK

MARJORIE BELL, B.Sc. (H.Ec.)

THE nurses of the Victorian Order know our Canadian homes better than any other group of people. They see constantly the wasteful buying, poor cooking, and bad food habits which science is pointing to as one of the chief causes of ill-health and suffering. Thus, it is not surprising that a nutrition worker should be appointed to their staff. The Central Board of the Victorian Order for Canada began to experiment by attaching a worker to their office for five months and lending her to the branch offices of Montreal and Toronto to demonstrate what could be done. In October, 1929, Montreal made the appointment permanent for their office.

With a large group of nurses such as there is in Montreal, where hundreds of homes are visited each month, one nutrition worker can act only in an advisory capacity. The bulk of the teaching must be done by the nurses themselves. One day a week is spent in each of the branch offices and time allowed for individual conferences with the nurses on the special problems of their families and districts. In the beginning, the weekly staff conferences were used for a definite series of talks on nutrition and during the year various phases that seemed to need stressing have been brought to the nurses' attention.

Adequate ante-natal diet is essential for the well formed body, good teeth and health of the child and for the protection of the mother. As the responsibility for instruction during this period is carried largely by the Victorian Order of Nurses, it was thought that the nutritionist should give most of her attention to that branch of the work. The nurses refer all cases where they feel there is a likelihood of co-operation. Visits are made if possible to all the primiparae and to the multiparae where there are dietary complications.

Ante-natal classes are held in each office. This group teaching saves much time and brings good results. The nutrition worker takes one or two classes in each series and has also tried the experiment of serving at the end of each class some dish that she would like brought into frequent use in the homes.

Mothers may be quite willing to buy and cook food properly but be unequal to teaching their children to eat it when it is cooked. The task of changing well established food likes and dislikes or the attitude of the child and mother to feeding is no easy one. Much trouble may be saved if young mothers are told of the difficulties they may expect and have explained to them the best known methods of building good food habits.

Though the ante-natal period is most stressed, the family in general cannot be entirely neglected. Budgetting has featured largely during the

whole year. More and more this seems the one practical way of dealing with the family diet. Through the mother keeping a record of what she buys one finds exactly what the family is eating and can then help to correct the faults. A valuable amount of accurate information on standards of living with regard to food is also collected.

During the winter a series of demonstrations was given to the practical women who do the housekeeping in the homes when the mother is ill. It is hoped, as a result, to improve the nutrition of the patient and also to show her a better method of feeding her family when she returns to her duties.

Nurses are sent to Montreal from the Central Office at Ottawa to receive a special three months' training for the Victorian Order. The nutrition worker has six classes with each group. The opportunity, through these nurses, to increase the teaching of nutrition in other parts of Canada makes the classes especially interesting.

The regular activities of the nutrition worker are frequently interrupted by interesting and worth-while digressions. Talks are given to various organizations and advice sought by other social agencies. Last winter the worker was allowed time to give a course of lectures to the students of public health nursing at the School for Graduate Nurses of the McGill University.

At the request of Dr. Grant Fleming, Director of the Department of Public Health and Preventive Medicine at McGill University, the Director of the Diet Dispensary and the nutrition workers of the Child Welfare and the Victorian Order are compiling receipts for a cook book which will be especially adapted to moderate incomes and good nutritional teaching. To do constructive work in homes one must satisfactorily replace the foods to which the family are accustomed. This book will fill a long felt need.

Results

While many of the results are discouraging, often some case will seem to justify the whole, and one marvels at the earnestness with which a busy woman will reconstruct her methods and enthusiastically pass them on to her neighbors. A mother of six even mailed her new recipes to friends and relatives outside the city.

The nurses enter homes of all classes of people which gives a splendid opportunity for teaching. A nutritionist is needed to keep her subject constantly before them and up to date. She should act mainly as a consultant, suggesting methods suitable to different types and collecting a useful supply of literature and posters. As the nurses develop their own teaching, more time is spent by the nutritionist in conferences and less in visiting.

INDUSTRIAL HYGIENE

F. G. PEDLEY, B.A., M.B., D.P.H.; J. G. CUNNINGHAM, B.A., M.B., D.P.H.

ASBESTOSIS

FRANK G. PEDLEY, M.D., D.P.H.

WITHIN the past five or six years industrial hygienists have become interested in the effects of asbestos on the health of workers. In the Province of Quebec a very considerable part of the world's supply of asbestos is mined, and the industry has been in existence for forty years or more. To our knowledge, however, no case of pneumoconiosis has been reported from asbestos in Canada, and the general impression among miners is that the dust is not hazardous. It is from England that the first cases of pulmonary asbestosis have been reported. Dr. W. E. Cooke, in 1924, published the history of a case of pulmonary fibrosis in an asbestos worker. Since then a small literature has developed, which promises to grow very much larger as time goes on.

The cases of asbestosis so far reported—with the exception of four Rhodesian miners—have occurred in the manufacture of asbestos; but it is quite possible that the condition in mines may have gone unrecognized, for mines are usually situated in the country, whereas factories are apt to be in the city where facilities for autopsies are better. If, however, miners were seriously affected by asbestos the effects should be reflected in a high tuberculosis death rate, provided the mining population was fairly stationary and did not go to sanatoria or elsewhere to die. It is believed that the population of Thetford Mines, P.Q., is quite stable. Since this town is given over entirely to the mining and milling of asbestos the following death rates per 100,000 from tuberculosis in Thetford Mines and the Province of Quebec during the years 1926, 1927 and 1928 will be of interest. (Quebec did not enter the registration area until 1926.)

	1926	1927	1928
Thetford Mines	176.5	124.5	112.7
Province of Quebec	128	121.8	121.1

In view of the fact that the population of Thetford Mines is only about 12,000 it is to be expected that the death rates would fluctuate considerably from year to year. These figures, therefore, do not indicate an undue mortality from tuberculosis in Thetford Mines.

Canadian asbestos occurs as a silky, fibrous form of serpentine in seams of varying width. Its analysis shows it to consist largely of magnesium silicate, but there is usually some iron present. Mining is carried on in open quarries, and is not usually a very dusty job, but in the milling a great deal of fine dust is created, and men who work there are heavily exposed to whatever hazard may exist. As mentioned above, however, it is the general impression, both among miners and physicians, that asbestos dust is not particularly harmful. There can be little doubt, however, that the disease, asbestosis, is a clinical entity,

and it has been recognized by the English authorities to the extent of its inclusion as a compensatable disease. (See: Jour. Amer. Med. Assn., June 28, 1930, p. 2078.)

Pathologically the lungs of an individual afflicted with asbestosis show a diffuse fibrosis, not unlike silicosis in the gross. Microscopically, however, the appearance is different. For one thing large particles of dust morphologically similar to asbestos dust can be found in the fibrotic areas. In silicosis the siliceous particles are very difficult to see and are very much smaller. In addition to the large particles of dust sections of the lung show yellowish, elongated bodies from 20 to 100 microns in length, usually dumb-bell shaped and often segmented. These are the "curious bodies" and have been described everywhere asbestosis has been reported. Their origin is not known, but it is thought that they are aggregations of protein material about a central spicule of asbestos.

Unquestionably these "curious bodies" have stimulated much interest in the disease, asbestosis. Pathologists, whose interest in such a disease might languish, become alive at the sight of the "curious bodies". From the public health standpoint, however, it seems hardly likely that asbestosis will become of importance either from the standpoint of morbidity or mortality.

The following is a fairly complete list of articles on the subject to date:

1. "Effects of Asbestos Dust on Workers' Health in Asbestos Mines and Factories".
Labour Gazette, Feb., 1912, 761.
2. "Fibrosis of the Lungs due to the Inhalation of Asbestos Dust".
W. E. Cooke, Brit. Med. Jour., July 26, 1924, p. 147.
3. "Pulmonary Asbestosis in its Clinical Aspects".
Thos. Oliver, Jour. Ind. Hyg., 9, 483, Nov., 1927.
4. "Pulmonary Asbestosis".
W. E. Cooke, Brit. Med. Jour., (Dec. 3, 1927), 1024.
5. "Histology of Pulmonary Asbestosis".
W. E. Cooke, Brit. Med. Jour., (Dec. 3, 1927), 1025.
6. "Asbestosis".
McDonald Stuart, Brit. Med. Jour., 1927, ii 1025.
7. "Pulmonary Asbestosis in South Africa".
F. W. Simson, Brit. Med. Jour., May 26, 1928, pp. 855-857.
8. "Asbestosis".
M. J. Stewart, Brit. Med. Jour., 1928, ii 509.
9. "Asbestosis".
H. E. Seiler, Brit. Med. Jour., ii, 1928:982.
10. "The Presence of Asbestos Fibre in the Lesions of Asbestos Workers".
S. R. Gloyne, Tubercle, June, 1929, p. 405.
11. "A Case of Pulmonary Asbestosis".
W. B. Wood & D. S. Page, Tubercle, July, 1929, p. 457.
12. "Asbestos Dust and the 'Curious Bodies' Found in Pulmonary Asbestosis".
W. E. Cooke, Brit. Med. Jour., Sept. 28, 1929, 578.
13. "Clinical Aspects of Pulmonary Asbestosis".
A. C. Haddow, Brit. Med. Jour., Sept. 29, 1929, 580.
14. "Further Observations on Pulmonary Asbestosis with Special Reference to Asbestos Dust and the 'Curious Bodies' Found in the Lungs".
W. E. Cooke, Jour. Royal Microscopic Soc., 1930, vol. 50, p. 15.
15. "Pulmonary Asbestosis. A Socio-medical Study".
Archiv für Gewerpepathologie und Gewberhygiene, Sonderabdruck aus 1. Band und 2. Heft, 1930.
16. "Asbestos".
Occupation & Health, International Labour Office, Brochure No. 27.
17. "The Occurrence of Pulmonary Fibrosis and other Pulmonary Affections in Asbestos Workers".
E. R. A. Merewether, Journ. Indust. Hygiene, 12, 198-222 and 239-257, May and June, 1930.

NATIONAL VOLUNTARY HEALTH AGENCIES

Ruby E. Hamilton, Reg.N.

THE PAGEANT OF MOTHERHOOD

Dr. Sarah McVean, Hamilton, Ont.

AN original effort to draw public attention to the alarmingly high maternal mortality rate in Canada was made this spring in Hamilton, Ont., through the medium of the Local Council of Women. The health committee of the Council, having observed the indifference and ignorance of the public in respect to this national problem and the difficulty of stimulating interest by the usual educational means, chose a novel method. This was to arouse concern in this menace to Canadian motherhood and Canadian homes in an artistic and emotional rather than in a statistical and scientific way.

Enlisting the aid of a newspaperwoman and an actor, the Council undertook to present, at popular prices, a play sufficiently dramatic and colorful to attract attention on its own merits, but embodying in its theme a forceful lesson in regard to the unnecessary deaths of Canadian mothers in or from causes connected with childbirth. This it most successfully did early in May when "The Pageant of Motherhood", a musical drama written by Nora-Frances Henderson and directed by Victor Tandy, a gifted English actor at present living in Hamilton, was presented at the Savoy Theater for two nights.

The Pageant of Motherhood", constructed on the lines of the morality play, characterized the good and evil forces which make for the happiness and misery of human life and affect the destiny of man. Humanity, Progress and Science and the evil and futile spirits of Selfishness, Apathy, Ignorance and Acceptivity play their parts before the overshadowing presence of the principal character, Old Father Time, which was taken by Mr. Tandy. Old Father Time watches the events of the world, loves and sorrows over humanity, casts his eyes backwards and forwards, knowing all, remembering all, foreseeing all, but powerless to stay the inexorable running of the sand in the mighty hourglass at his side. The scenes of the play show the conflict betweeh the good and evil spirits in the interests of the mothers of the world. In one scene, when Time is remembering, great mothers of the past file before him. Among these is Rachel who died giving birth to Benjamin. Science explains how young she was, how little she could help, how Ignorance worsted her!

One beautiful and pathetic scene shows the spirits of little unborn children awaiting entrance to life. Time stretches out loving, welcoming arms, but the sinister figure of Human Destiny counts them over and takes many away. They are to be deprived of the gift of life. Selfishness, Apathy, Ignorance and Acceptivity flaunt themselves laughing. Another

poignant scene shows the four mothers who die every day in childbirth in Canada. They are telling their hopes and fears to Old Father Time. One woman whispers of her first baby coming to her, another with a child at her side, asks Time, fearfully, to stop his sand running. She is afraid of the future! Then behind them comes fateful Human Destiny making them blind—the only kind thing he can do! Ignorance, Selfishness and the other evil spirits mock them. The curtain descends on them facing the future with their closed eyes—they are like the fifteen hundred Canadian mothers who die every year, unaware of their impending fate.

The last scene shows Progress, Science and Humanity, renewing their pledges to fight for mothers. The radiant, perfect mother of the future, who shall bear her children without danger, comes before them in a vision. Time stretches out his arms to them, he tells them he will ever be with them in their long, lonely, difficult journey into the future.

Nearly 500 were turned away the first night and the theatre was packed again for the second performance. This was due to the splendid efforts of the council through all its affiliated societies to interest men and women of all classes in the presentation. While many tickets were given away through social service and public health agencies and a nominal price of 25 cents charged, hundreds of interested citizens paid from a dollar to five dollars to see the performance in order to assist its financing. Over 100 were in the cast and the staging effects were singularly beautiful. The fact that the public library and its branches ran out of text books on maternal and child care after the presentation speaks well for "The Pageant of Motherhood" as an educational effort.

REPORTED CASES OF CERTAIN COMMUNICABLE DISEASES IN CANADA* BY PROVINCES—SEPTEMBER, 1930

Diseases	P.E.I.	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Diphtheria....	1	17	11	142	247	35	16	23	40
Scarlet Fever..	3	44	41	221	192	53	25	41	46
Measles.....	—	7	—	119	51	20	20	7	30
Whooping Cough.....	—	24	—	206	317	70	21	45	110
German Measles....	—	1	—	4	5	†	—	1	1
Mumps.....	—	6	—	35	42	24	7	8	9
Smallpox.....	—	—	—	—	9	—	1	1	3
Cerebrospinal Meningitis..	—	3	—	3	16	1	1	1	3
Anterior Poliomyelitis	—	4	—	9	215	18	17	45	6
Typhoid Fever	—	8	35	115	102	17	20	25	11

*Data furnished by the Dominion Bureau of Statistics, Ottawa.
†Not reportable.

NEWS AND COMMENTS

P. A. T. SNEATH, M.D., D.P.H.

American Public Health Association
Annual Meeting, Fort Worth, Texas

THERE was some doubt in the minds of many of the Association members as to whether or not the attendance at the Annual Meeting might not be influenced by the distance to be covered by the Eastern, Western and Northern delegates in reaching Fort Worth. This doubt was rapidly dispelled, however; the registration reaching the very respectable total of 1100. The academic sessions were of above average merit, and the hospitality of the local people was unbounded.

The choice of the City of Montreal for the 1931 meeting is a matter of interest to all Canadian health workers. The enthusiasm of the Governing Council in the proposed visit of the Association to Canada, after an absence of almost twenty years, was evidenced by the almost unanimous acceptance of the Report of the Committee on Meetings and Publications.

The Canadian representation, while not as great as in former years, was very creditable. Dr. J. A. Amyot, Dr. Norman MacLeod Harris and Mr. Geo. Ferguson were present from the Federal Department of Health; Manitoba was represented by the Honourable Dr. E. M. Montgomery, Minister of Health for the Province, and Dr. F. Cadham of Winnipeg; while Dr. and Mrs. Roberts of Hamilton, Dr. Gordon Jackson and Alderman Robert Allen of Toronto, with Dr. H. E. Ferguson, also of Toronto; Doctors Phair, McKay, McNally and Johnston of the Provincial Department of Health, and Dr. Gordon Bates of the Canadian Social Hygiene Council, were registered. The opportunity of renewing old acquaintances, of establishing new professional and social contacts, and of further cementing the friendly relationships that exist among American and Canadian health workers, was appreciated by all those in attendance.

Among others, it was noted that Dr. J. W. S. McCullough of the Provincial Department of Health and Dr. D. T. Fraser of the School of Hygiene, University of Toronto, were chosen for executive posts in the Association; the former being elected Second Vice-President of the Association, and the latter, to the Executive Council of the Section of Laboratory Workers.

Saskatchewan Health Officials' Association

THE Fifth Annual Convention of the Saskatchewan Health Officials' Association met in the Hotel Saskatchewan, Regina, on October 15th and 16th.

Over fifty delegates from all points of the Province registered in spite of adverse weather conditions and a very enthusiastic and instructive meeting resulted.

The round table conference was found to be particularly interesting and a great variety of subjects were discussed and views exchanged.

At the annual banquet of the Association on the evening of October 15th there were between 70 and 80 persons present and the Hon. F. D. Munroe, M.D., Minister of Public Health for the Province of Saskatchewan, gave an inspiring address on public health, following which a number of public health films were shown. The members were the guests of the Regina Board of Trade at this dinner.

The following officers were elected for the ensuing year:

President—W. R. Coles, M.D., Regina.

Vice-President—R. G. Ferguson, M.D., Ft. Qu'Appelle.

Executive—Christina R. Peers, R. N., Regina. F. Cartlidge, Moosejaw. D. P. Miller, M.D., Prince Albert. J. R. Malek, Regina. H. Jamieson,

Swift Current. W. H. Orme, V.S., Saskatoon.

Secretary-Treasurer—R. H. Murray, C.E., Regina.

At the annual business meeting it was decided to hold the next annual convention in Regina, and it was announced that the Canadian Public Health Association would join with the Association in its meeting next year.

British Columbia

DR. C. HAYWARD has resigned from his appointment as Superintendent of the Montreal General Hospital to become Superintendent of the Vancouver General Hospital, which position was rendered vacant by the retirement of Dr. F. C. Bell through illness.

Manitoba

DR. W. A. SHOULTS, Director of Food Control, attended the convention of the International Association of Dairy and Milk Inspectors at Cleveland, Ohio.

The Hon. Dr. E. W. Montgomery, Minister of Health and Public Welfare, and Dr. Fred Cadham, Provincial Bacteriologist, represented Manitoba at the Fort Worth meeting of the American Public Health Association.

Ontario

THE following are registered at the University of Toronto, as students in the School of Hygiene in the course leading to the Diploma in Public Health:—Dr. A. Bossinotte, Matane, P.Q., Dr. A. R. Chisholm, Victoria, B.C., Dr. I. M. Cleghorn, Baldur, Man., Dr. A. Cantin, St. Côme, P.Q., Dr. J. J. Fraser, Guelph, Ont., Dr. J. E. Germain, Rimouski, P.Q., Dr. C. F. Hames, Regina, Sask., Dr. A. Jeannotte, Ville Marie, P.Q., Dr. B. C. Keeping, Georgetown, P.E.I., Dr. B. LaHaye, Nicolet, P.Q., Dr. A. M. Menzies, Vancouver, B.C., Dr. G. Moffat, Weston, Ont., Dr. E. Potvin, Chicoutimi, P.Q., Dr. M. G. Thomson, Victoria, B.C.

Dr. J. W. S. McCullough, Chief Inspector, Department of Health, Ontario, was honored by election to the distinguished office of Vice-President at the recent meeting of the American Public Health Association at Fort Worth, Texas.

A mental clinic for children has been opened at Stratford under the supervision of Dr. Chalk of the Ontario Hospital, London.

Dr. B. T. McGhie, Superintendent of the Ontario Hospital, Orillia, and Director of Mental Clinics for the Province has been appointed to the newly created post of Director of Hospitals for Ontario.

A small outbreak of typhoid fever is reported to have occurred in Belleville during the last few weeks from which two deaths have resulted. This epidemic is considered to have been caused through the agency of milk from a local dairy, one of the employees of which has been found to be a carrier.

Dr. A. R. B. Richmond, Director of the Division of Food Control, Department of Health, Toronto, was elected President of the International Association of Dairy and Milk Inspectors at their meeting at Cleveland, Ohio.

Prince Edward Island

LEGISLATION has been enacted permitting of the organization of a full time health service. It is expected that the organization will be completed during the coming year.

Dr. B. C. Keeping of Georgetown is attending the School of Hygiene, University of Toronto.

CURRENT HEALTH LITERATURE

D. T. Fraser, B.A., M.B., D.P.H.

Immunity to Poliomyelitis in Mothers and the Newborn as shown by the Neutralization Test. *Aycock and Kramer—J. Exp. Med. Vol.* 52, *No.* 4, *Oct.* 1, 1930.

The authors present data in support of the thesis that the process of immunization in poliomyelitis and in diphhtheria is similar. As children approach adult life their susceptibility to both diseases diminishes. Further the incidence of both diseases is low in infants. The fact that maternal transmission of immunity is established in diphtheria suggests that a similar mechanism was operating in poliomyelitis. When the serum of the cord blood of nine infants and the serum of the corresponding mothers were mixed with virus respectively, incubated for two hours, placed in the ice-box overnight and inoculated intracerebrally into rhesus monkeys, in one case the infants serum neutralized the virus, while the mixture of virus and mother's serum developed the disease on the seventeenth day. The control animal developed the disease on the eighth day. This test while somewhat doubtful probably represents a degree of immunity in the mother's serum since an animal surviving more than fourteen days is taken by the authors as probably representing partial neutralization. The serum of two mothers and their infants failed to neutralize the virus. The duration of maternal immunity is probably not long, since other experiments have shown that the immunity in the 1 to 5 year age group is relatively low. This is further supported by the epidemiological data that in this group the incidence of the disease is high. It is significant that the mothers tested in this small series were from urban centres.

Cultivation of Vaccine Virus. *Li and Rivers—J. Exp. Med. Vol.* 52, *No.* 4, *Oct.* 1, 1930.

Embryonic chick tissue suspended in Tyrode's solution is used as the medium and is contained in specially designed flasks to prevent evaporation and at the same time permit of adequate aeration. In this manner the cultivation of the virus may be carried out so that the volume of culture is large. This is, of course, a very important factor, for obviously the possibility of growing vaccine virus suitable for Jennerian prophylaxis in man becomes correspondingly nearer realization. Typical vaccinal lesions are produced upon the scarified shaved skin of a rabbit. Serum from an immune rabbit completely neutralizes the culture virus and an immune serum prepared with the culture virus neutralizes the parent strain. In these experiments as in those of other investigators living cells of a susceptible host are employed. Vaccine virus has not been cultivated in the absence of such cells. Levaditi's neuro-vaccine was used throughout. Work is in progress to determine whether the dermovirus can be adapted to the medium. If this is successful and if such material is stable there seems no reason to doubt that the distribution of a bacteriologically sterile vaccine virus suitable for human use will be accomplished.